TRMM Data Service Update

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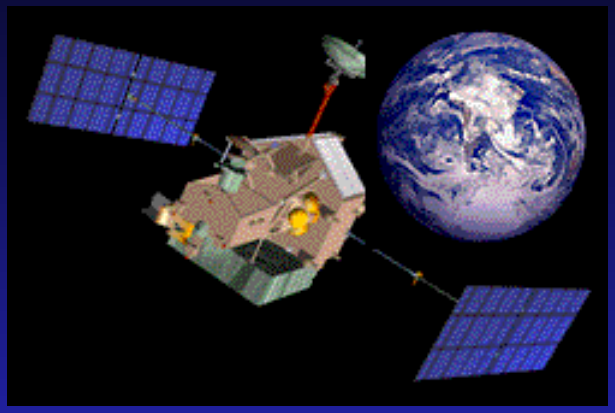
NASA Goddard Earth Sciences Data and Information Center (GES DISC)

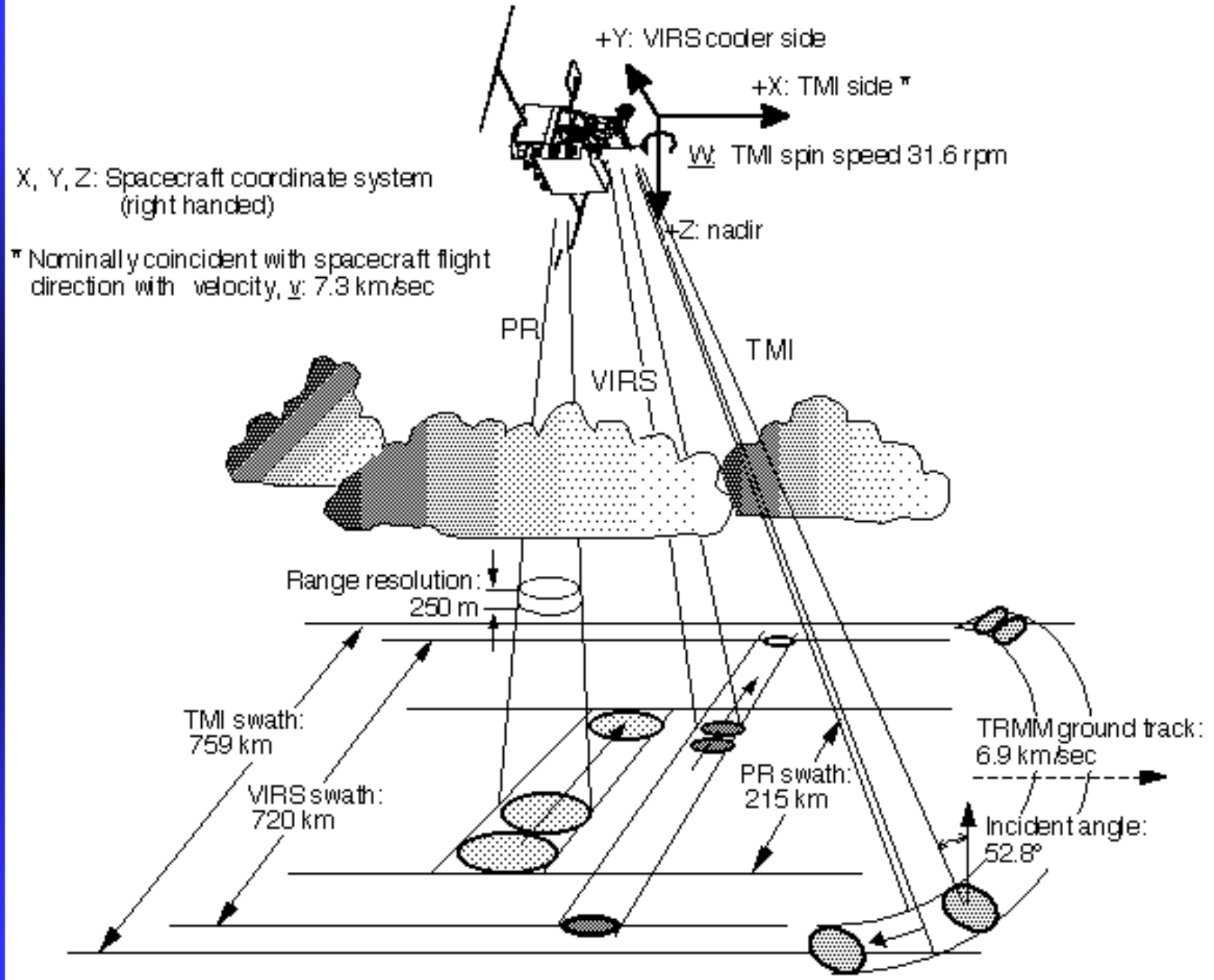
Outline

- Overview of TRMM data services
- Mirador (Data access made simple)
- TOVAS (Data access without downloading data and software)
- Other tools and examples (YOTC, HDAT, Giovanni)
- Other data services (OPeNDAP, WMS, etc.)
- Future plans

What is TRMM ?



The Tropical Rainfall Measuring Mission (TRMM) is a joint U.S.-Japan satellite mission to monitor tropical and subtropical (40° S - 40° N) precipitation and to estimate its associated latent heating.


+Y: VIRS cooler side
+X: TMI side *
W: TMI spin speed 31.6 rpm
+Z: nadir
X, Y, Z: Spacecraft coordinate system
(right handed)
* Nominally coincident with spacecraft flight direction with velocity, v: 7.3 km/sec
PR
VIRS
TMI
Range resolution:
250 m
TMI swath:
759 km
VIRS swath:
720 km
PR swath:
215 km
TRMM ground track:
6.9 km/sec
Incident angle:
52.8°

Mirador (Data Access Made Simple)

- An earth science data search tool developed at the GES DISC
- Simplified, clean interface
- Google mini appliance for metadata keyword searches.
- Spatial and parameter subsetting, format conversion
- Gazetteer (geographic search by feature name capability)

Mirador

+ GES DISC Home
Mirador
+ OVERVIEW
+ HELP CENTER
+ DATA HOLDINGS
+ VIEW CART
Additional Features
+ News
+ Restricted Data
+ Feedback
+ FAQ
Mirador
Data Access Made Simple
You are here: Keyword Search
Keyword
Projects
Science Areas
Keyword: Required
Location:
Time Span
From:
To:
Search GES-DISC
Advanced Search
Available: AIRS, OMI, MLS, HIRDLS, TOMS, UARS, TRMM, GLDAS, SORCE, Subsets from A-Train Sensors (e.g MODIS, AIRS, OMI and MLS), MERRA, GOCART, LIMS, MSU, NEESPI, NLDAS, SSBUV, TOVS
What's New: Quality Screening for AIRS Level 2 Products; TRMM 3B42 available with netCDF conversion and compression
OpenSearch
Acknowledgements:
Location Gazetteer data from: National GeoSpatial Information Agency
Events Gazetteer data from: Unisys, EPA and Smithsonian Global Volcanism Program
LATEST NEWS
2011-01-14T22:01:17Z - AIRS Near-Real Time Data and the Dry Season in African savanna
AIRS Near-Real Time Data shows dust and smoke in African savanna
+ Read More
2011-01-14T20:16:58Z - Caspian Sea temperatures set in motion, set to music
Russian scientist creates simulation of daily sea surface temperatures in the Caspian Sea
+ Read More
2011-01-07T16:47:28Z - GES DISC provides rapid analysis of factors contributing to record Australian floods
Rainfall and temperature data and anomalies demonstrate dramatic departures from normal conditions
+ Read More
2011-01-04T15:26:10Z - Solar Radiation and Climate Experiment (SORCE) Collection 11 released
Total Solar Irradiance (TSI) data update is now available at the GES DISC
+ Read More

An example:

Mirador
Data Access Made Simple
You are here: Keyword Search
Keyword
Projects
Science Areas
Keyword: daily rainfall
Location: (-20,2),(22,48)
Time Span
From: 1998
To: 2000
Search GES-DISC
Advanced Search
Available: AIRS, OMI, MLS, HIRDLS, TOMS, UARS, TRMM, GLDAS, SORCE, Subsets from A-Train Sensors (e.g MODIS, AIRS, OMI and MLS), MERRA, GOCART, LIMS, MSU, NEESPI, NLDAS, SSBUV, TOVS
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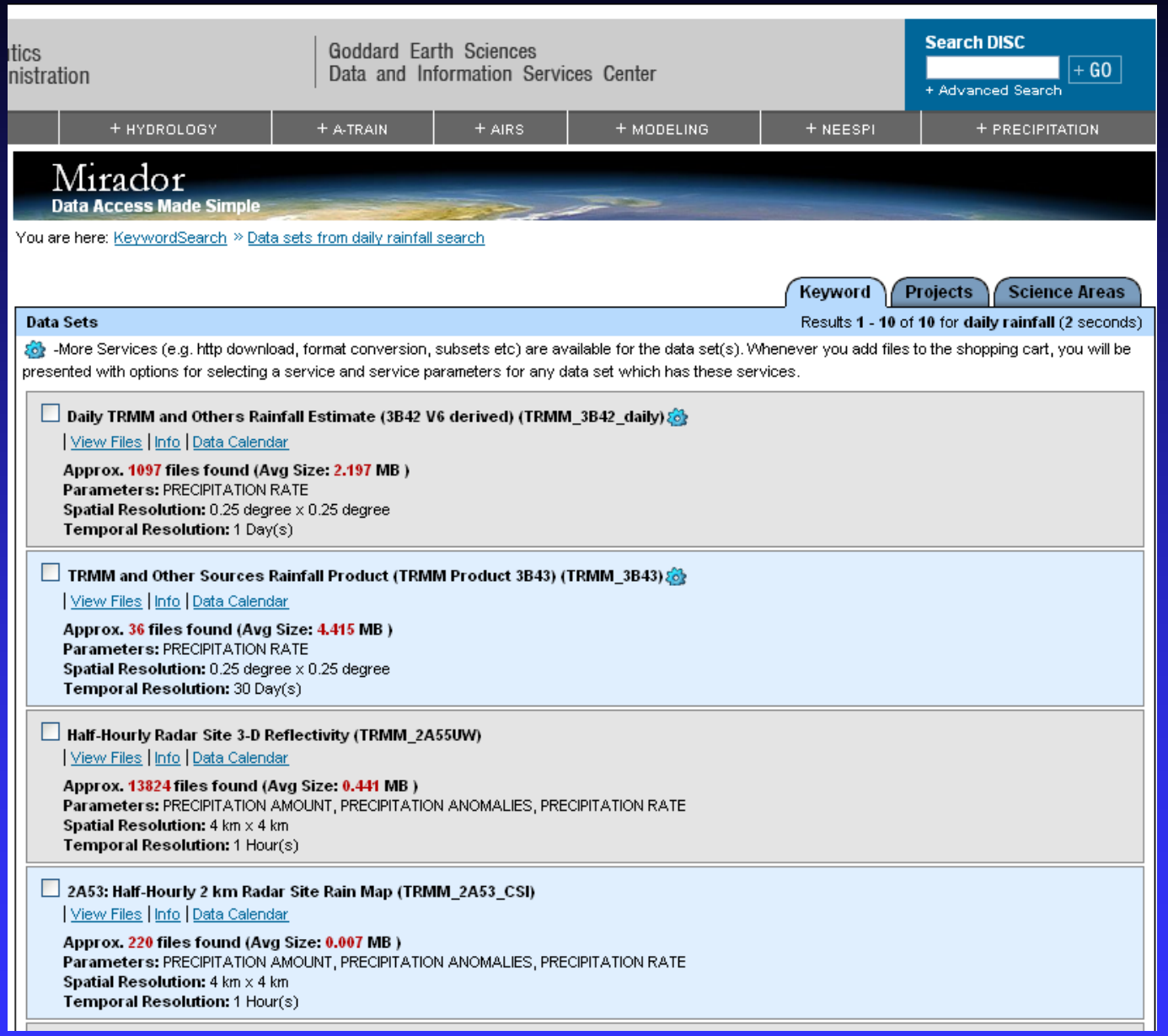
+ Read More
2011-01-14T20:16:58Z - Caspian Sea temperatures set in motion, set to music
Russian scientist creates simulation of daily sea surface temperatures in the Caspian Sea
+ Read More


tics
nistration
Goddard Earth Sciences
Data and Information Services Center
Search DISC
+ GO
+ Advanced Search
+ HYDROLOGY
+ A-TRAIN
+ AIRS
+ MODELING
+ NEESPI
+ PRECIPITATION
Mirador
Data Access Made Simple
You are here: KeywordSearch » Data sets from daily rainfall search
Keyword
Projects
Science Areas
Data Sets
Results 1 - 10 of 10 for daily rainfall (2 seconds)
-More Services (e.g. http download, format conversion, subsets etc) are available for the data set(s). Whenever you add files to the shopping cart, you will be presented with options for selecting a service and service parameters for any data set which has these services.
Daily TRMM and Others Rainfall Estimate (3B42 V6 derived) (TRMM_3B42_daily)
View Files | Info | Data Calendar
Approx. 1097 files found (Avg Size: 2.197 MB)
Parameters: PRECIPITATION RATE
Spatial Resolution: 0.25 degree x 0.25 degree
Temporal Resolution: 1 Day(s)
TRMM and Other Sources Rainfall Product (TRMM Product 3B43) (TRMM_3B43)
View Files | Info | Data Calendar
Approx. 36 files found (Avg Size: 4.415 MB)
Parameters: PRECIPITATION RATE
Spatial Resolution: 0.25 degree x 0.25 degree
Temporal Resolution: 30 Day(s)
Half-Hourly Radar Site 3-D Reflectivity (TRMM_2A55UW)
View Files | Info | Data Calendar
Approx. 13824 files found (Avg Size: 0.441 MB)
Parameters: PRECIPITATION AMOUNT, PRECIPITATION ANOMALIES, PRECIPITATION RATE
Spatial Resolution: 4 km x 4 km
Temporal Resolution: 1 Hour(s)
2A53: Half-Hourly 2 km Radar Site Rain Map (TRMM_2A53_CSI)
View Files | Info | Data Calendar
Approx. 220 files found (Avg Size: 0.007 MB)
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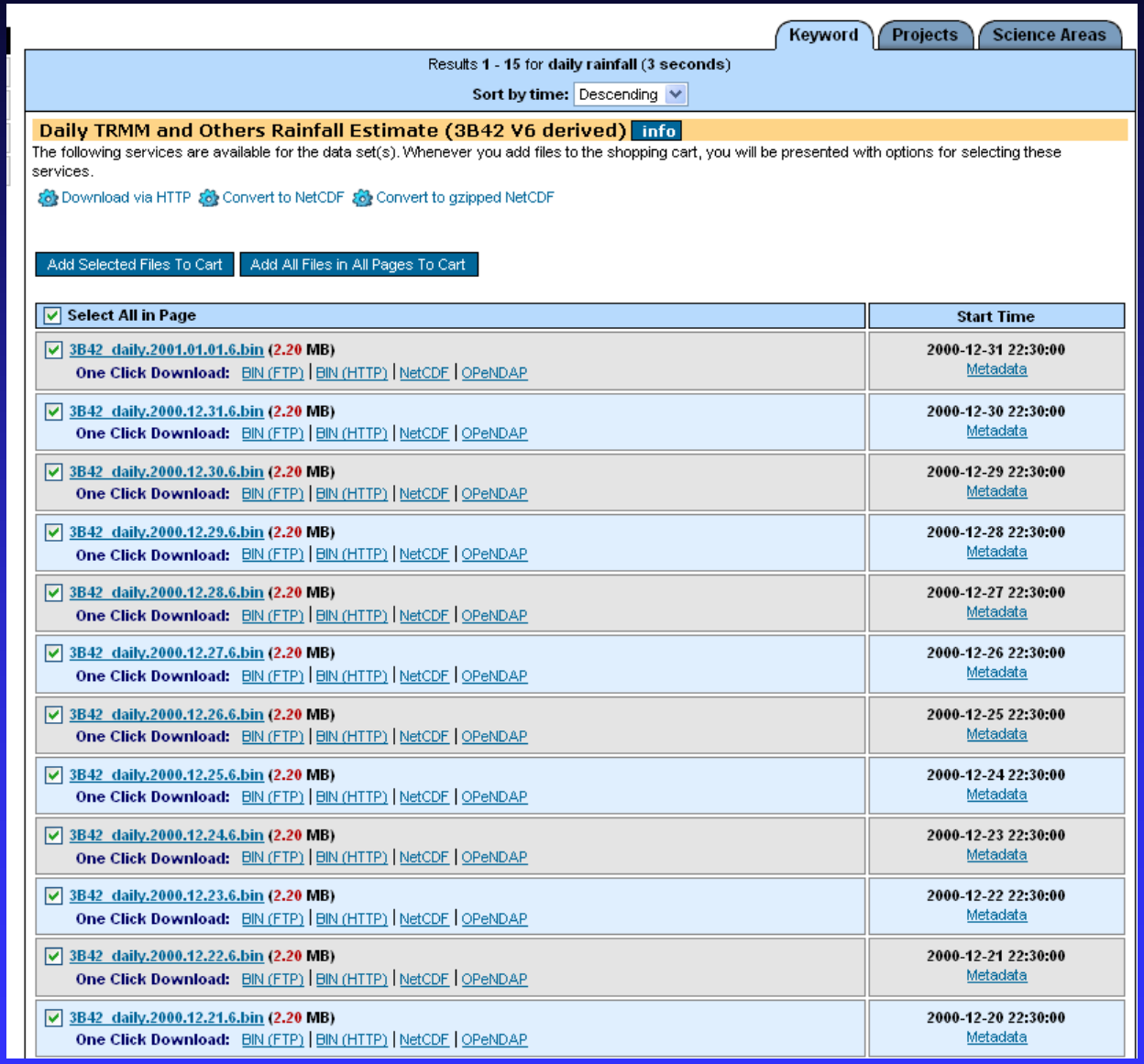
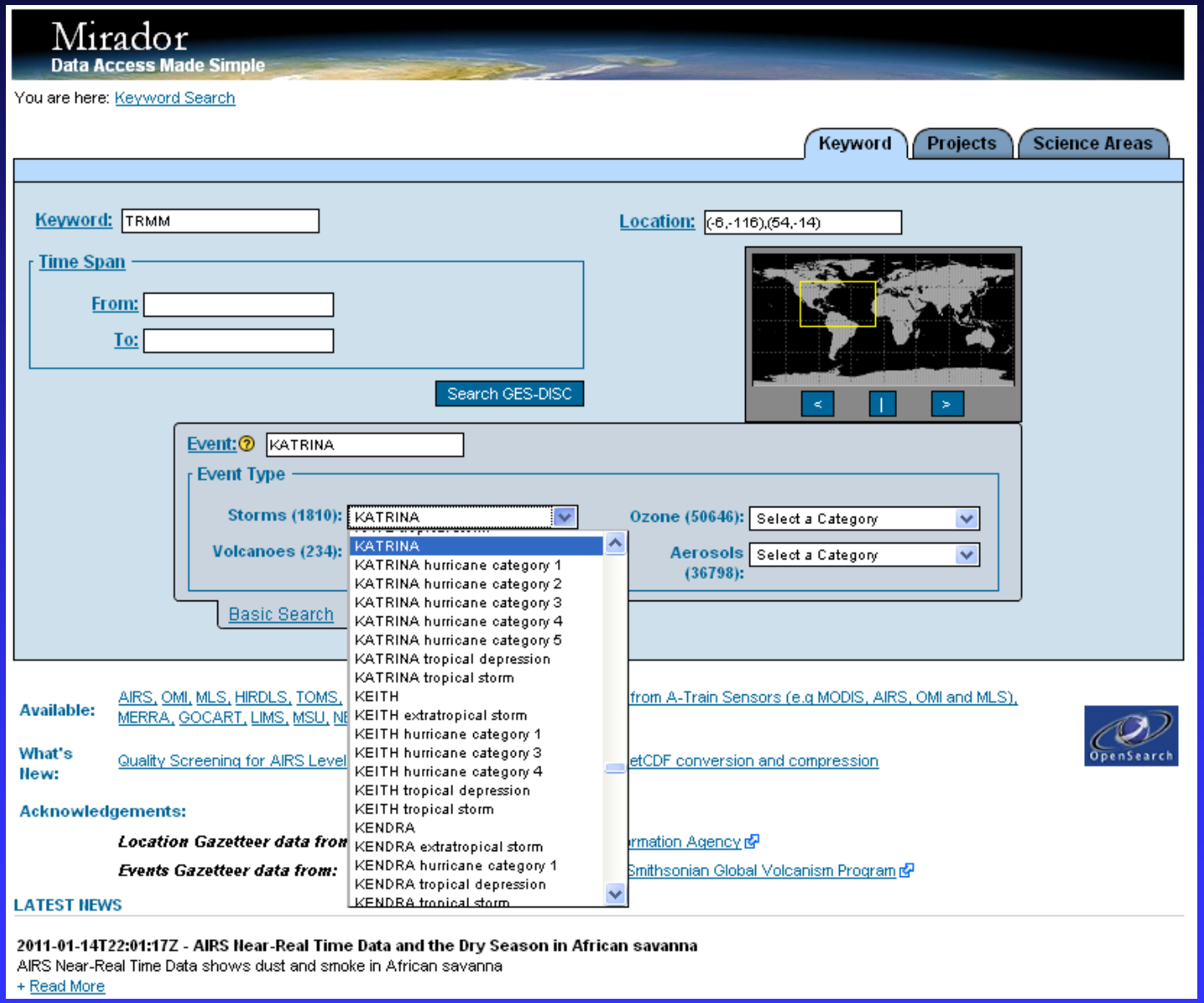
Spatial Resolution: 4 km x 4 km
Temporal Resolution: 1 Hour(s)


Keyword
Projects
Science Areas
Results 1 - 15 for daily rainfall (3 seconds)
Sort by time: Descending
Daily TRMM and Others Rainfall Estimate (3B42 V6 derived) info
The following services are available for the data set(s). Whenever you add files to the shopping cart, you will be presented with options for selecting these services.
Download via HTTP
Convert to NetCDF
Convert to gzipped NetCDF
Add Selected Files To Cart
Add All Files in All Pages To Cart
Select All in Page
Start Time
3B42_daily.2001.01.01.6.bin (2.20 MB)
One Click Download: BIN (FTP) | BIN (HTTP) | NetCDF | OPeNDAP
2000-12-31 22:30:00
Metadata
3B42_daily.2000.12.31.6.bin (2.20 MB)
One Click Download: BIN (FTP) | BIN (HTTP) | NetCDF | OPeNDAP
2000-12-30 22:30:00
Metadata
3B42_daily.2000.12.30.6.bin (2.20 MB)
One Click Download: BIN (FTP) | BIN (HTTP) | NetCDF | OPeNDAP
2000-12-29 22:30:00
Metadata
3B42_daily.2000.12.29.6.bin (2.20 MB)
One Click Download: BIN (FTP) | BIN (HTTP) | NetCDF | OPeNDAP
2000-12-28 22:30:00
Metadata
3B42_daily.2000.12.28.6.bin (2.20 MB)
One Click Download: BIN (FTP) | BIN (HTTP) | NetCDF | OPeNDAP
2000-12-27 22:30:00
Metadata
3B42_daily.2000.12.27.6.bin (2.20 MB)
One Click Download: BIN (FTP) | BIN (HTTP) | NetCDF | OPeNDAP
2000-12-26 22:30:00
Metadata
3B42_daily.2000.12.26.6.bin (2.20 MB)
One Click Download: BIN (FTP) | BIN (HTTP) | NetCDF | OPeNDAP
2000-12-25 22:30:00
Metadata
3B42_daily.2000.12.25.6.bin (2.20 MB)
One Click Download: BIN (FTP) | BIN (HTTP) | NetCDF | OPeNDAP
2000-12-24 22:30:00
Metadata
3B42_daily.2000.12.24.6.bin (2.20 MB)
One Click Download: BIN (FTP) | BIN (HTTP) | NetCDF | OPeNDAP
2000-12-23 22:30:00
Metadata
3B42_daily.2000.12.23.6.bin (2.20 MB)
One Click Download: BIN (FTP) | BIN (HTTP) | NetCDF | OPeNDAP
2000-12-22 22:30:00
Metadata
3B42_daily.2000.12.22.6.bin (2.20 MB)
One Click Download: BIN (FTP) | BIN (HTTP) | NetCDF | OPeNDAP
2000-12-21 22:30:00
Metadata
3B42_daily.2000.12.21.6.bin (2.20 MB)
One Click Download: BIN (FTP) | BIN (HTTP) | NetCDF | OPeNDAP
2000-12-20 22:30:00
Metadata

Advanced search:



Mirador
Data Access Made Simple
You are here: KeywordSearch » Data sets from TRMM search
Keyword
Projects
Science Areas
Data Sets
Results 1 - 10 of 52 for TRMM (13 seconds)
For event, did you mean ...
KATRINA tropical depression
KATRINA tropical storm
KATRINA hurricane category 1
KATRINA hurricane category 2
KATRINA hurricane category 3
KATRINA hurricane category 4
KATRINA hurricane category 5
-More Services (e.g. http download, format conversion, subsets etc) are available for the data set(s). Whenever you add files to the shopping cart, you will be presented with options for selecting a service and service parameters for any data set which has these services.
TRMM and Other Sources Rainfall Product (TRMM Product 3B43) (TRMM_3B43)
View Files | Info | Data Calendar
Approx. 1 files found (Avg Size: 4.415 MB)
Parameters: PRECIPITATION RATE
Spatial Resolution: 0.25 degree x 0.25 degree
Temporal Resolution: 30 Day(s)
Daily TRMM and Others Rainfall Estimate (3B42 V6 derived) (TRMM_3B42_daily)
View Files | Info | Data Calendar
Approx. 11 files found (Avg Size: 2.197 MB)
Parameters: PRECIPITATION RATE
Spatial Resolution: 0.25 degree x 0.25 degree
Temporal Resolution: 1 Day(s)
TRMM 3-Hourly 0.25 deg. TRMM and Other-GPI Calibration Rainfall Data (TRMM_3B42)
View Files | Info | Data Calendar
Approx. 185 files found (Avg Size: 0.312 MB)
Parameters: PRECIPITATION RATE
Spatial Resolution: 0.25 degree x 0.25 degree
Temporal Resolution: 3 Hour(s)
TRMM Precipitation Radar (PR) Gridded Surface Rain Total Product (TRMM Product 3A26) (TRMM_3A26)
View Files | Info | Data Calendar
Approx. 1 files found (Avg Size: 5.502 MB)
Parameters: PRECIPITATION RATE
Spatial Resolution: 5 degrees x 5 degrees
Temporal Resolution: 31 Day(s)
TRMM Ground Validation (GV) Calibrated Radar Reflectivity Product (TRMM GV Product 1C51) (TRMM_1C51)
View Files | Info

Overview of TOVAS

What is TOVAS?

TOVAS stands for the **TRMM Online Visualization and Analysis System**. The NASA GES DISC is home of TRMM data archive. To facilitate data access, we have developed TOVAS.

What can TOVAS do?

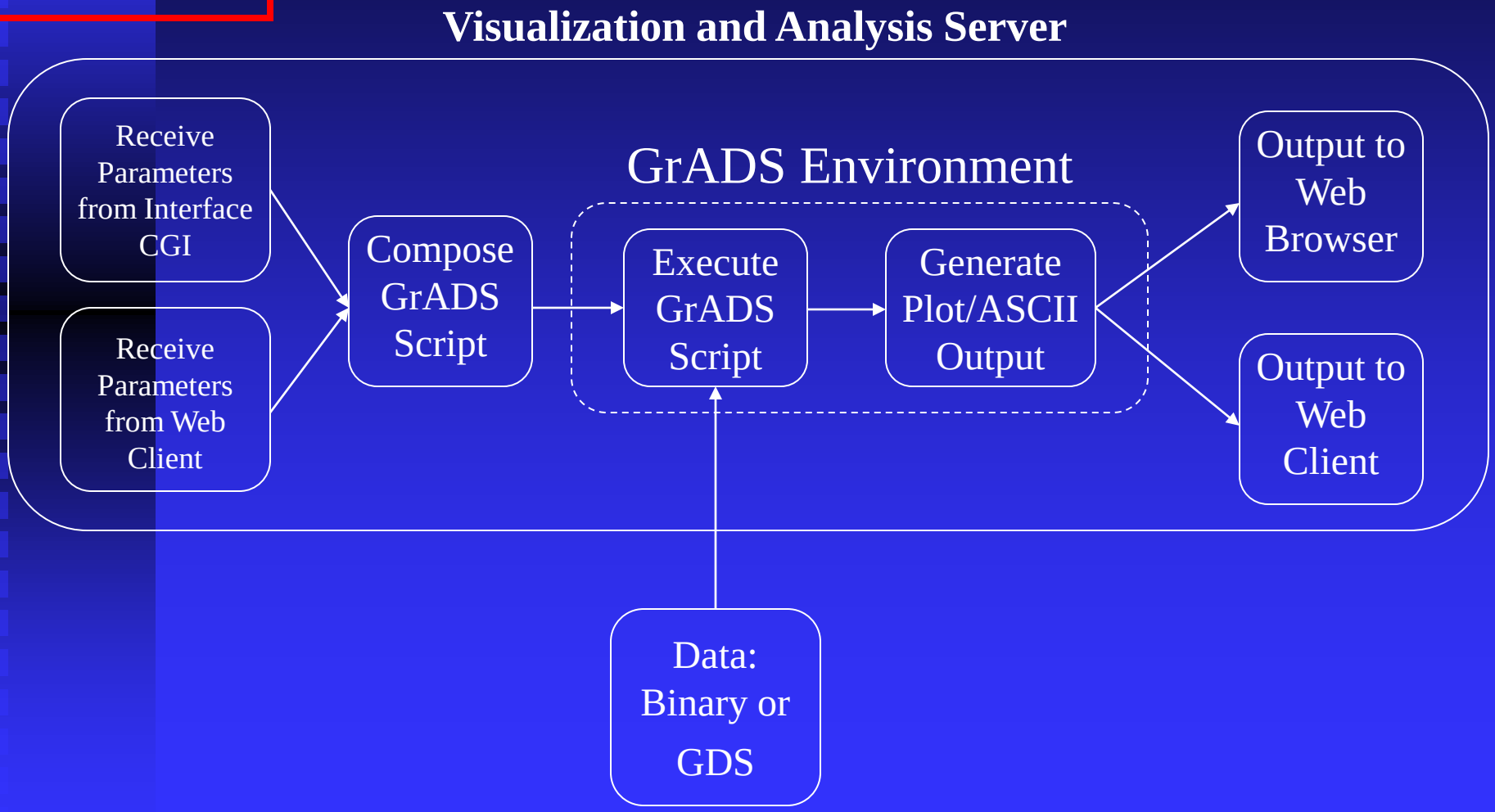
TOVAS allow an easy access to many popular TRMM Level-3 gridded precipitation products, near-real-time products and other precipitation products without **downloading data and software.**

An easy access:

- Generate customized maps, plots, animation, etc.
- Obtain customized data (maps, time series, Hovmoller diagram)
- Format conversion (NetCDF, binary, ASCII)

- Reliable
- Flexible
- Low-cost

TOVAS System Description



TRMM and Other Precipitation Products in TOVAS:

- Near-real-time 3-hourly
- Daily
- Monthly
- Climatology and anomaly
- Willmott Climate Data (monthly, land only)
- Global Precipitation Climatology Centre (monthly, land only)

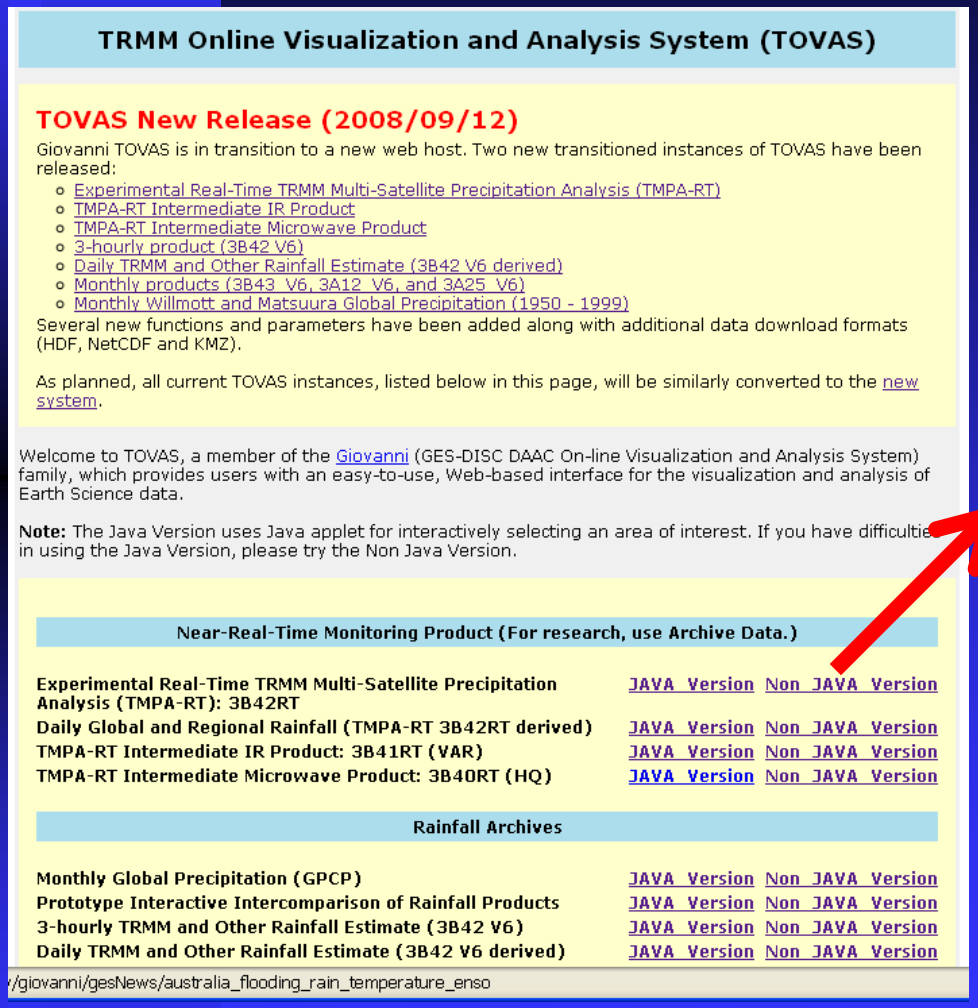
Services/functions:

- Lat-lon map
- Time series
- Hovmoller diagram
- Scatter plot
- Animation
- Difference/overlay (map and time series)

Services/functions (cont.):

- Anomaly and percent of normal
- Outputs (ASCII, NetCDF, HDF, binary, etc.)
- KMZ (Google Earth)

TOVAS Landing Page:



TRMM Online Visualization and Analysis System (TOVAS)

TOVAS New Release (2008/09/12)

Giovanni TOVAS is in transition to a new web host. Two new transitioned instances of TOVAS have been released:

- Experimental Real-Time TRMM Multi-Satellite Precipitation Analysis (TMPA-RT)
- TMPA-RT Intermediate IR Product
- TMPA-RT Intermediate Microwave Product
- 3-hourly product (3B42 V6)
- Daily TRMM and Other Rainfall Estimate (3B42 V6 derived)
- Monthly products (3B43 V6, 3A12 V6, and 3A25 V6)
- Monthly Willmott and Matsuura Global Precipitation (1950 - 1999)

Several new functions and parameters have been added along with additional data download formats (HDF, NetCDF and KMZ).

As planned, all current TOVAS instances, listed below in this page, will be similarly converted to the new system.

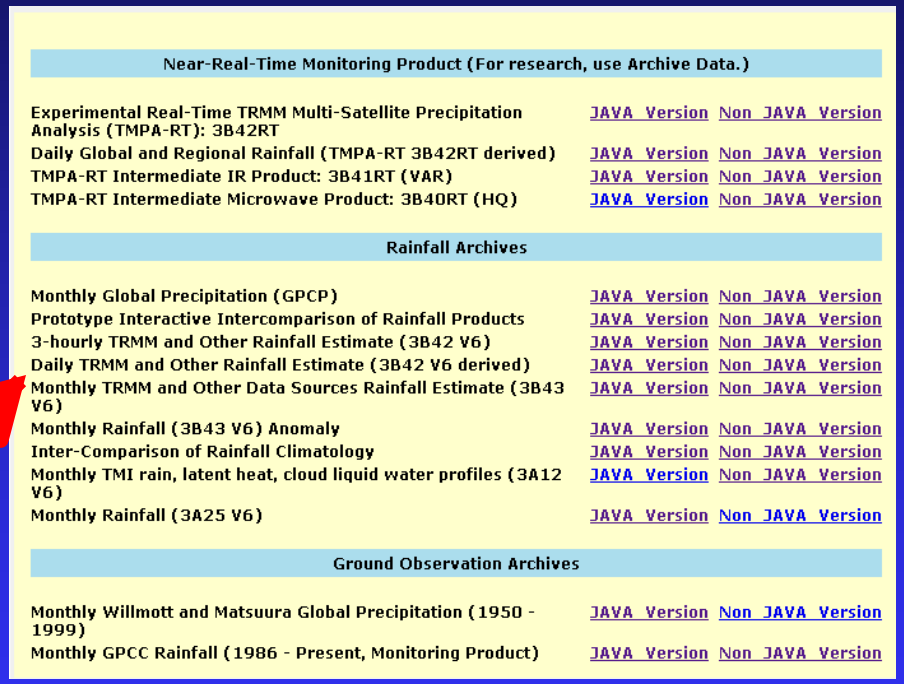
Welcome to TOVAS, a member of the Giovanni (GES-DISC DAAC On-line Visualization and Analysis System) family, which provides users with an easy-to-use, Web-based interface for the visualization and analysis of Earth Science data.

Note: The Java Version uses Java applet for interactively selecting an area of interest. If you have difficulties in using the Java Version, please try the Non Java Version.

Near-Real-Time Monitoring Product (For research, use Archive Data.)		
Experimental Real-Time TRMM Multi-Satellite Precipitation Analysis (TMPA-RT): 3B42RT	JAVA Version	Non JAVA Version
Daily Global and Regional Rainfall (TMPA-RT 3B42RT derived)	JAVA Version	Non JAVA Version
TMPA-RT Intermediate IR Product: 3B41RT (VAR)	JAVA Version	Non JAVA Version
TMPA-RT Intermediate Microwave Product: 3B40RT (HQ)	JAVA Version	Non JAVA Version

Rainfall Archives		
Monthly Global Precipitation (GPCP)	JAVA Version	Non JAVA Version
Prototype Interactive Intercomparison of Rainfall Products	JAVA Version	Non JAVA Version
3-hourly TRMM and Other Rainfall Estimate (3B42 V6)	JAVA Version	Non JAVA Version
Daily TRMM and Other Rainfall Estimate (3B42 V6 derived)	JAVA Version	Non JAVA Version

/giovanni/gesNews/australia_flooding_rain_temperature_enso

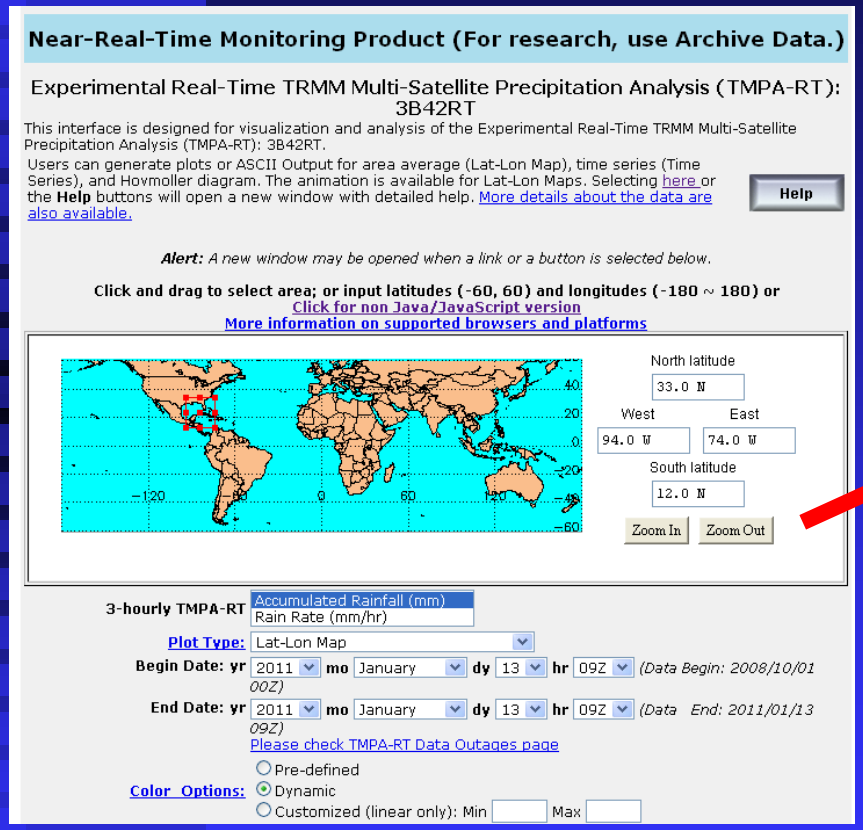


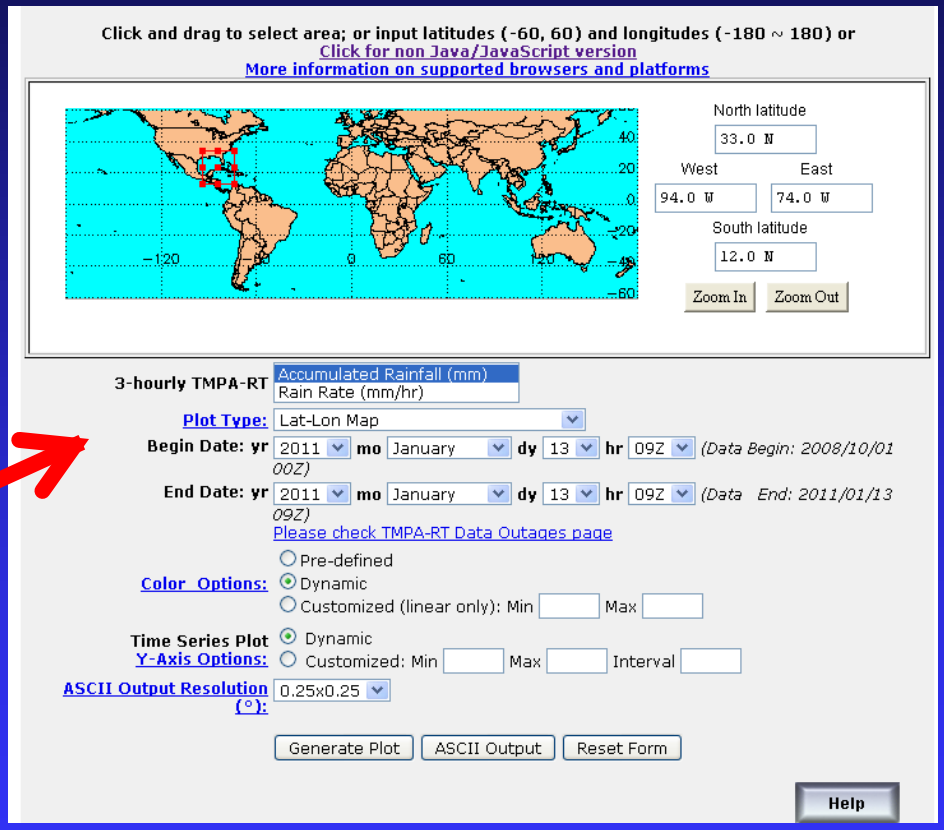
Near-Real-Time Monitoring Product (For research, use Archive Data.)		
Experimental Real-Time TRMM Multi-Satellite Precipitation Analysis (TMPA-RT): 3B42RT	JAVA Version	Non JAVA Version
Daily Global and Regional Rainfall (TMPA-RT 3B42RT derived)	JAVA Version	Non JAVA Version
TMPA-RT Intermediate IR Product: 3B41RT (VAR)	JAVA Version	Non JAVA Version
TMPA-RT Intermediate Microwave Product: 3B40RT (HQ)	JAVA Version	Non JAVA Version

Rainfall Archives		
Monthly Global Precipitation (GPCP)	JAVA Version	Non JAVA Version
Prototype Interactive Intercomparison of Rainfall Products	JAVA Version	Non JAVA Version
3-hourly TRMM and Other Rainfall Estimate (3B42 V6)	JAVA Version	Non JAVA Version
Daily TRMM and Other Rainfall Estimate (3B42 V6 derived)	JAVA Version	Non JAVA Version
Monthly TRMM and Other Data Sources Rainfall Estimate (3B43 V6)	JAVA Version	Non JAVA Version
Monthly Rainfall (3B43 V6) Anomaly	JAVA Version	Non JAVA Version
Inter-Comparison of Rainfall Climatology	JAVA Version	Non JAVA Version
Monthly TMI rain, latent heat, cloud liquid water profiles (3A12 V6)	JAVA Version	Non JAVA Version
Monthly Rainfall (3A25 V6)	JAVA Version	Non JAVA Version

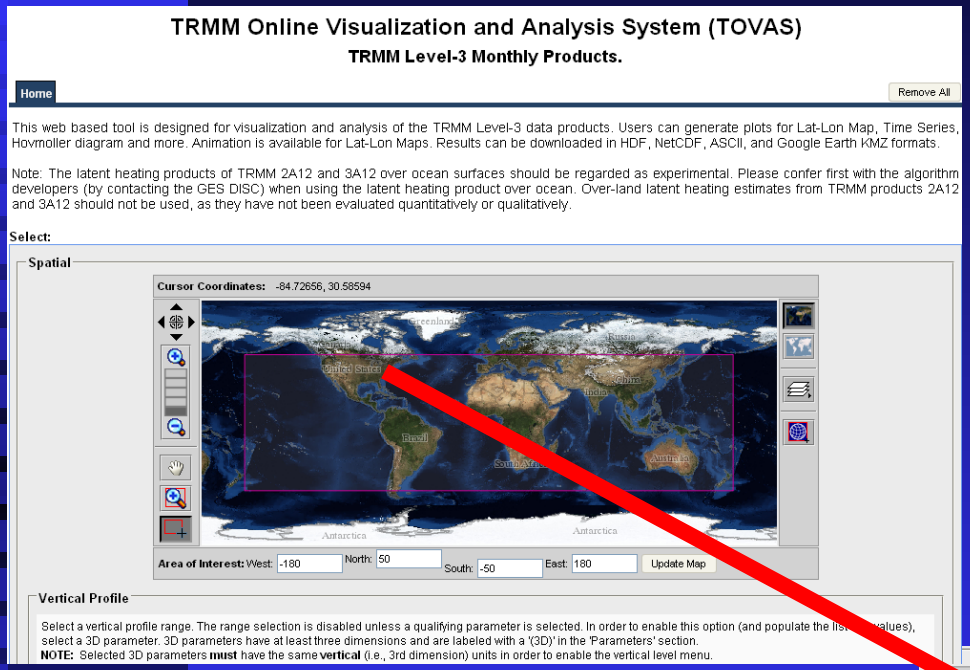
Ground Observation Archives		
Monthly Willmott and Matsuura Global Precipitation (1950 - 1999)	JAVA Version	Non JAVA Version
Monthly GPCC Rainfall (1986 - Present, Monitoring Product)	JAVA Version	Non JAVA Version

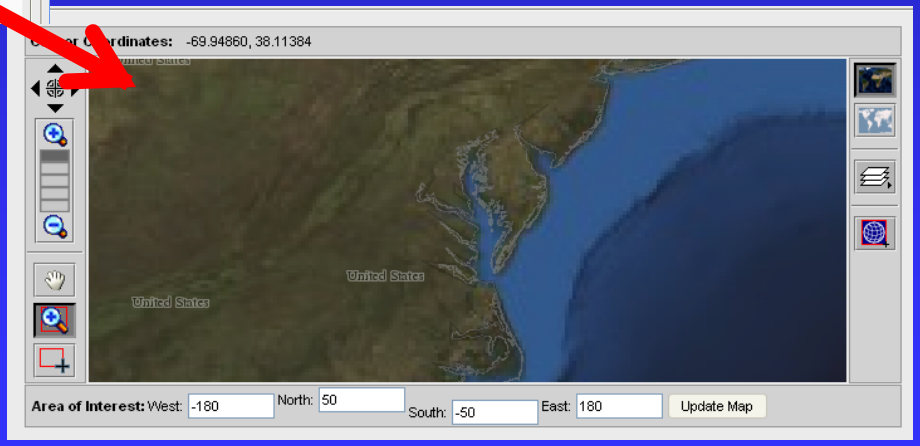
TOVAS Interface:



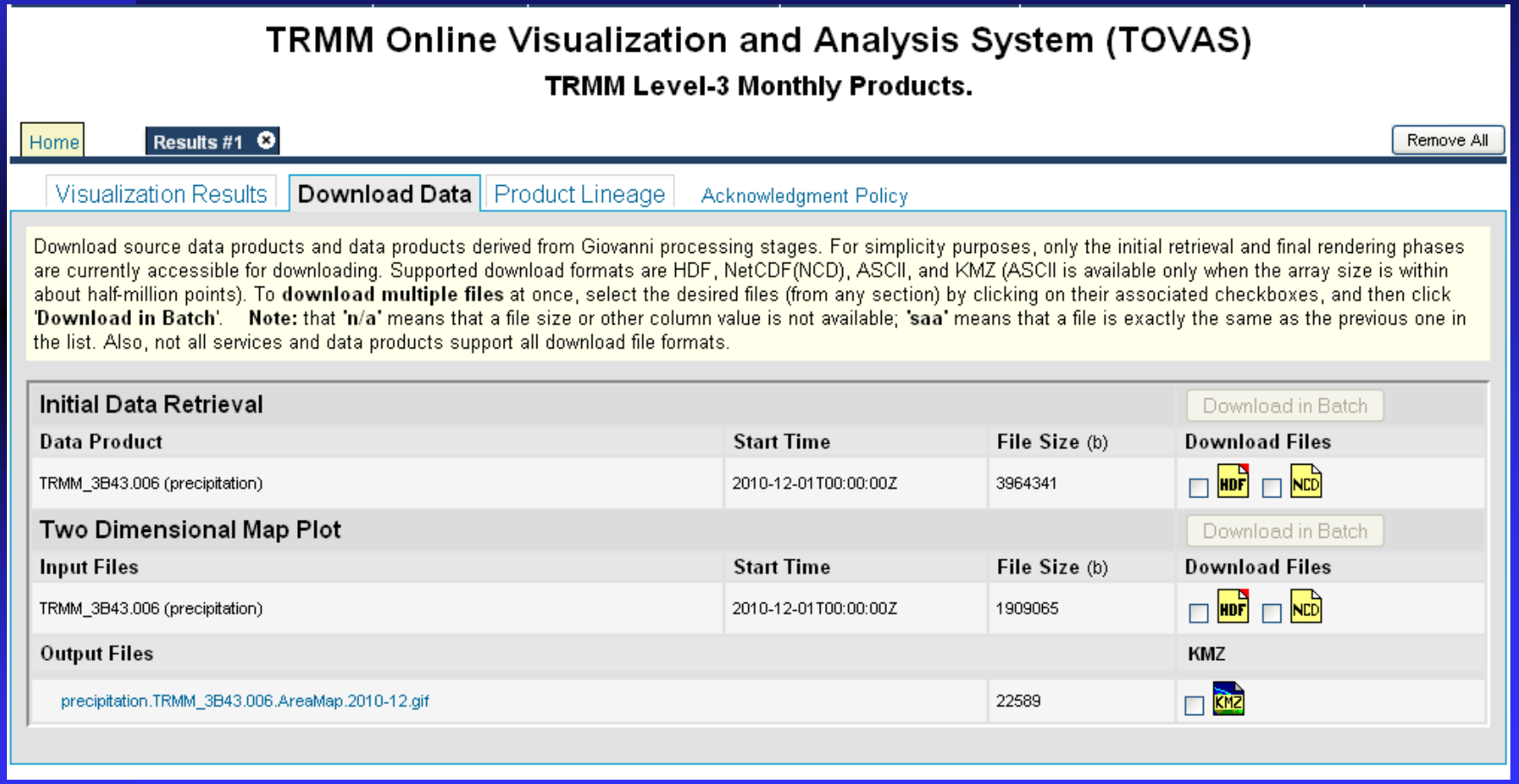


TOVAS Interface (cont.):



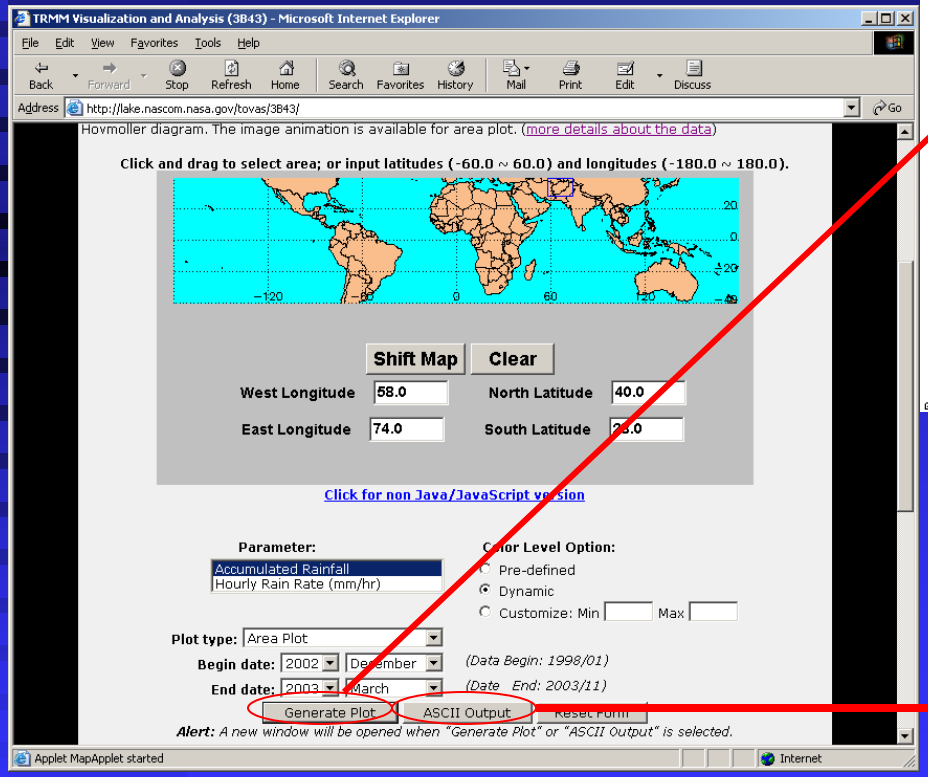


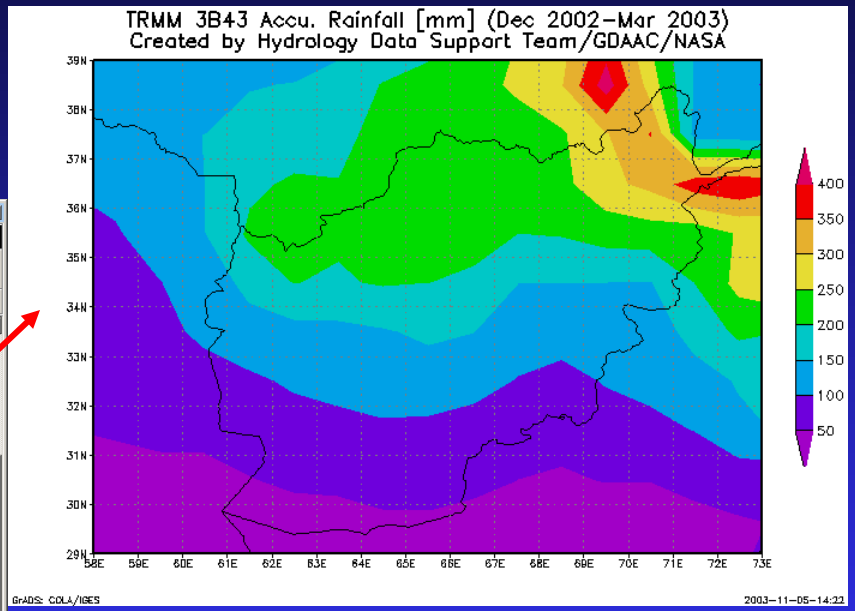
TOVAS Interface (Cont.):

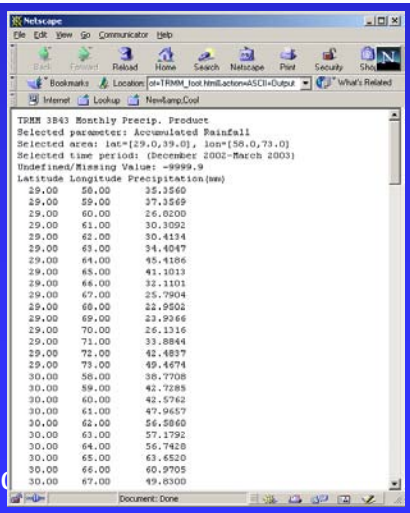


Examples of TOVAS

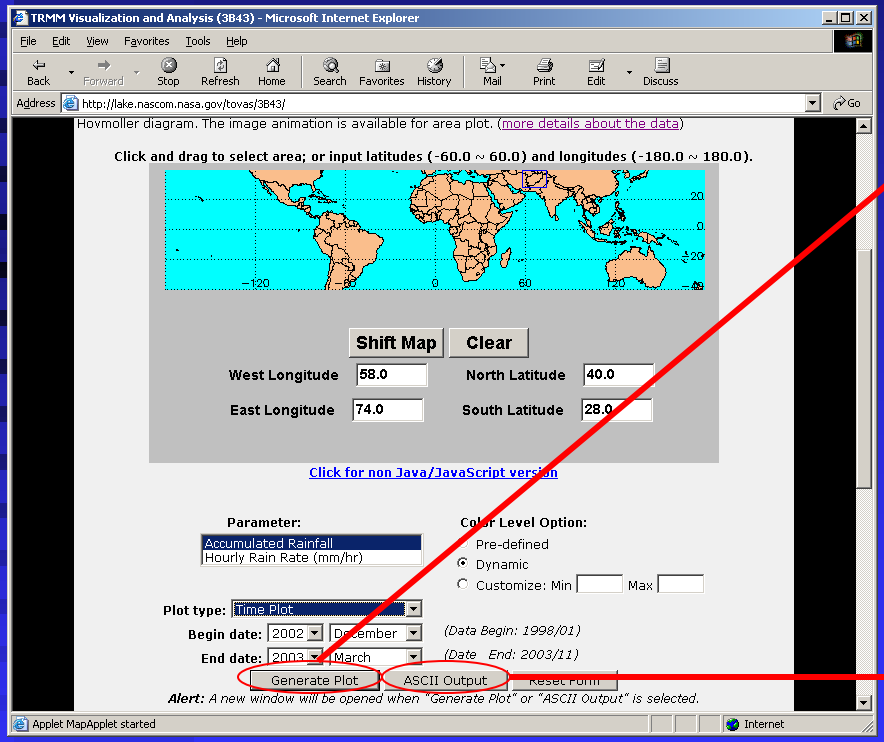
TOVAS Functions – Area Plot

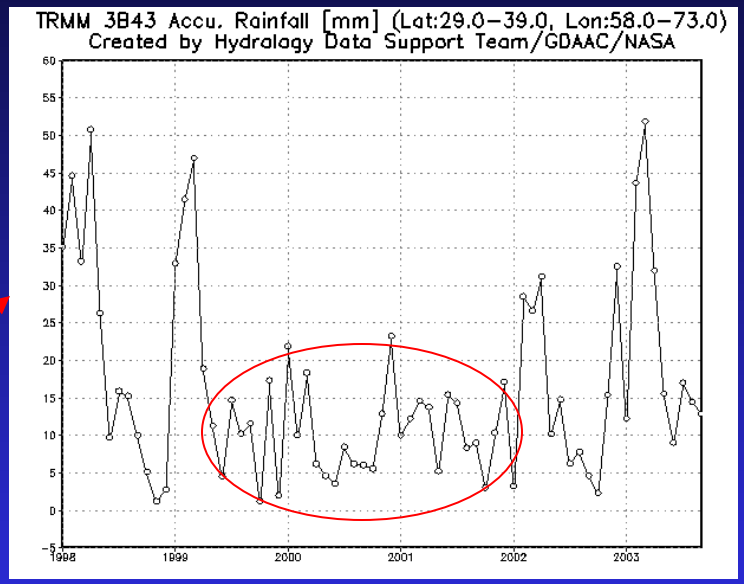


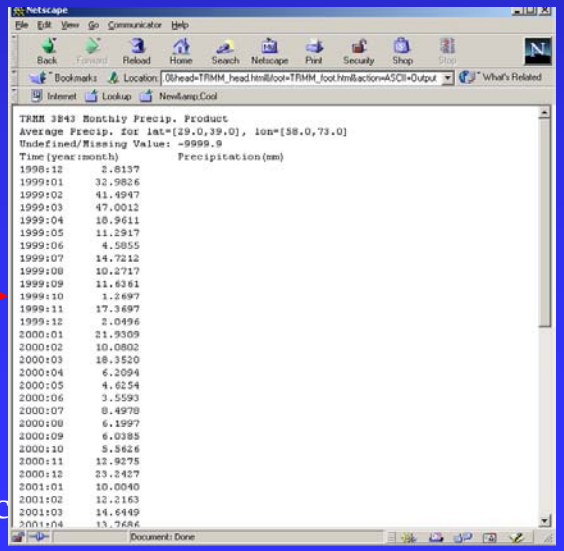




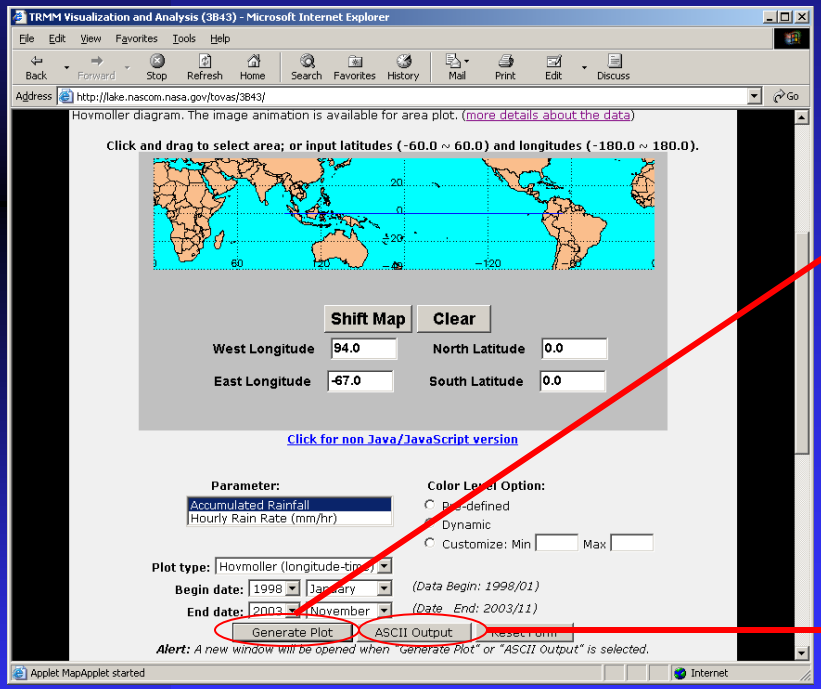
TOVAS Functions (cont.) – Time Plot

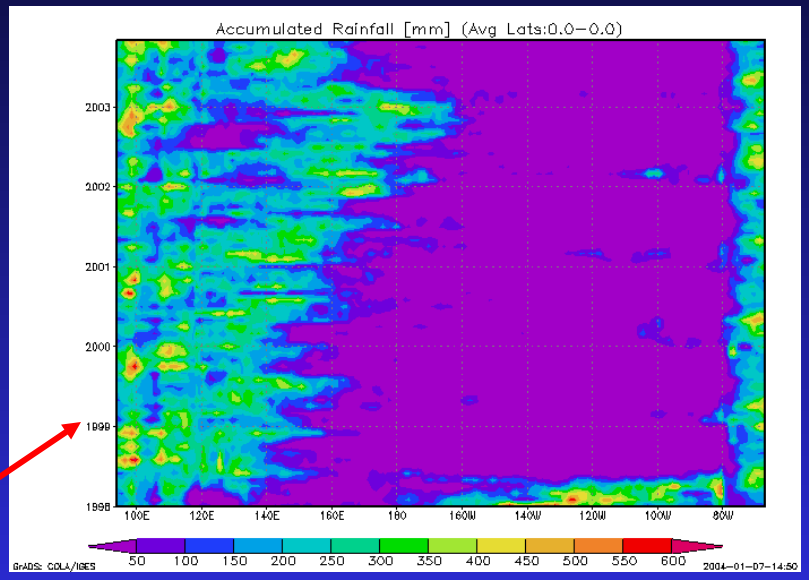


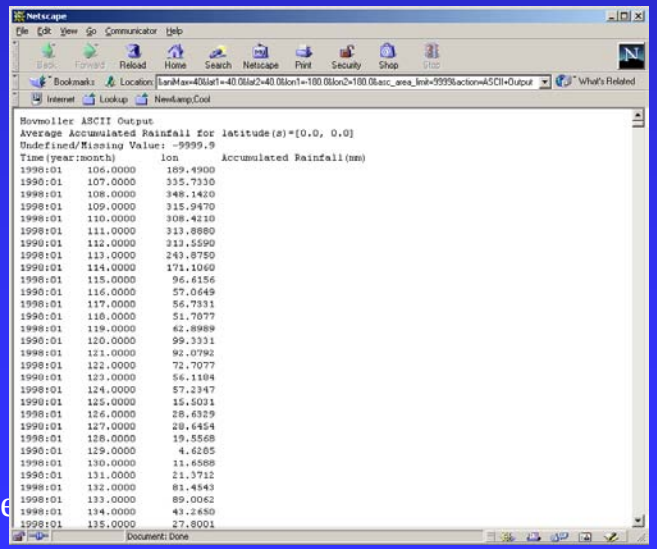




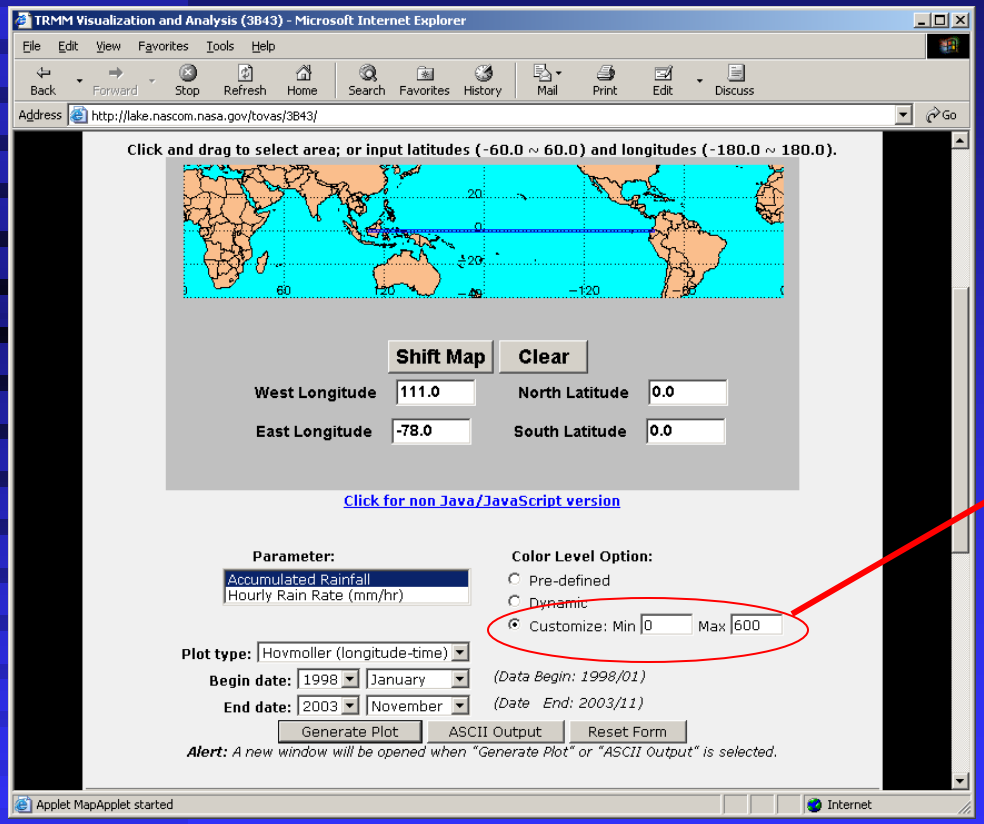
TOVAS Functions (cont.) – Hovmoller

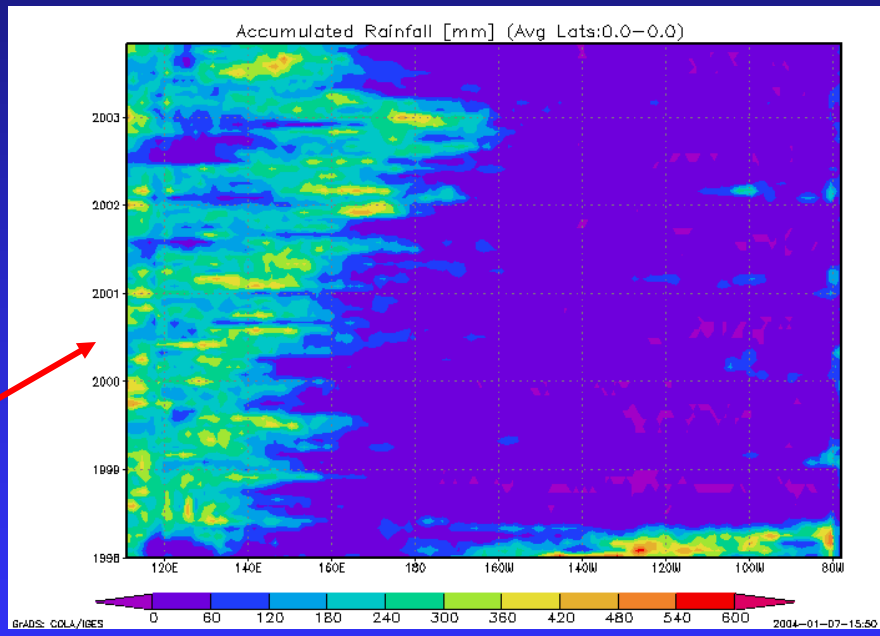




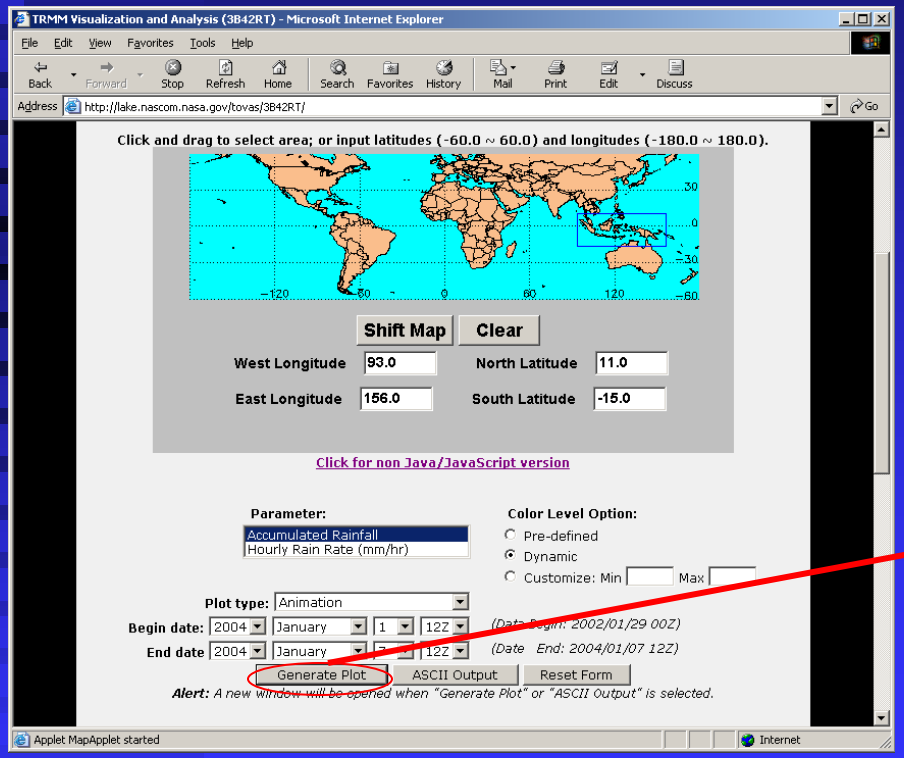


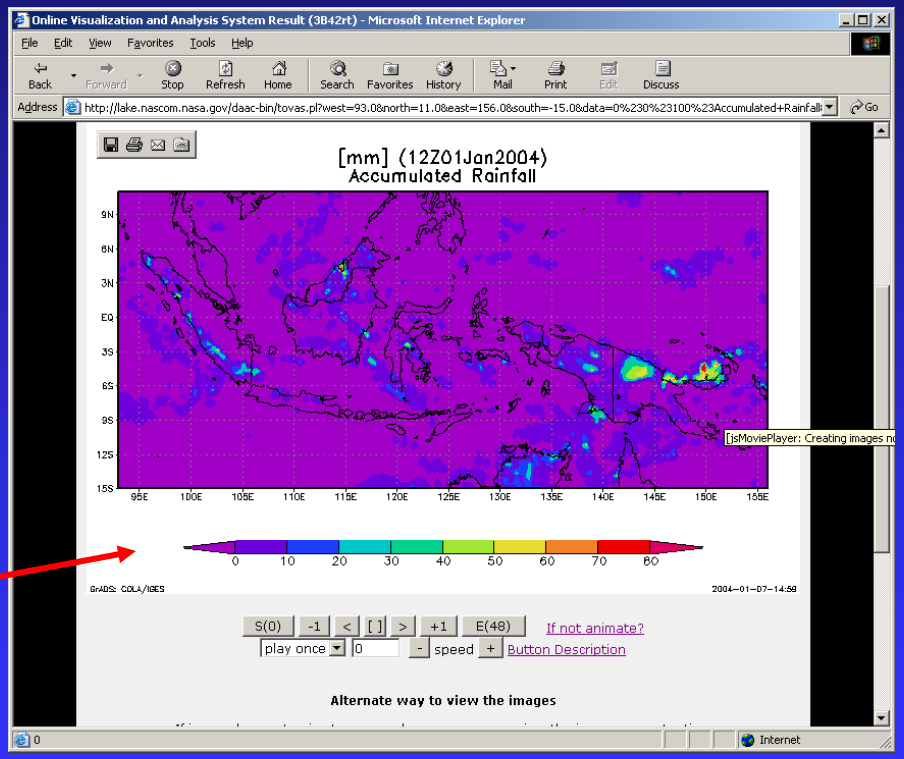
TOVAS Functions (cont.) – Custom Plot





TOVAS Functions (cont.) – Animation



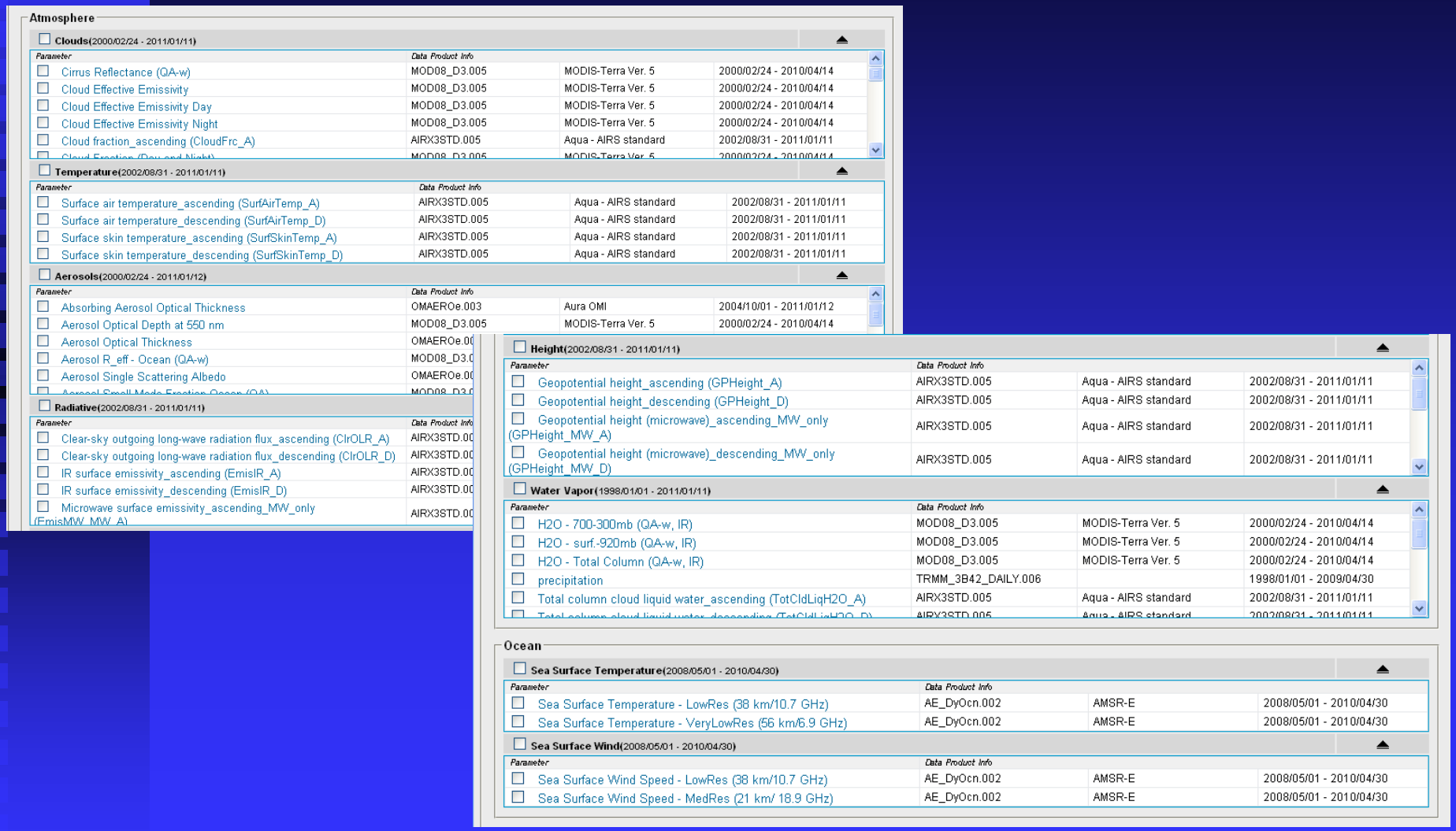


Other tools and examples (YOTC, HDAT, Giovanni)

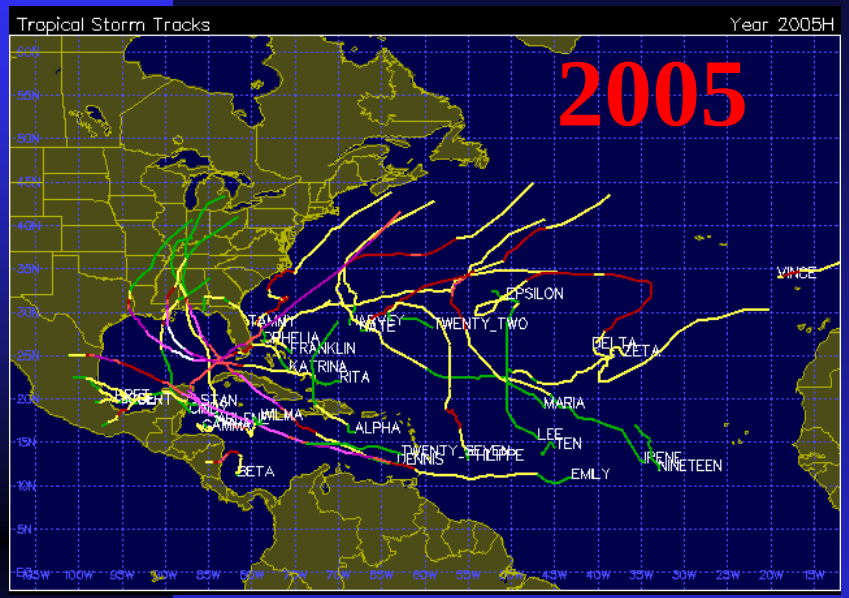
YOTC (Year of Tropical Convection)

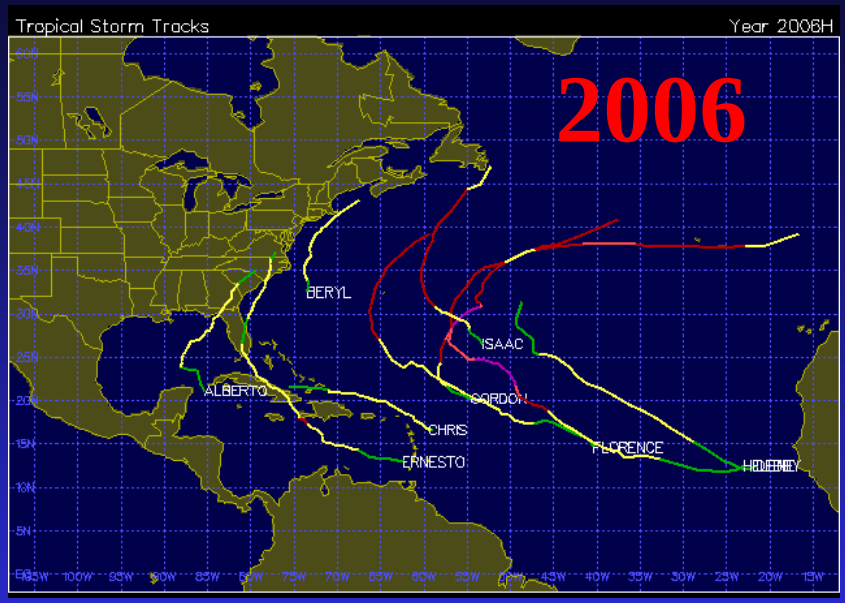
- **YOTC-GS L3** is a web-based graphics and analysis tool to explore Level 3 data products.
- **YOTC-GS L2** is a web-based graphics and analysis tool to explore Level 2 data products.

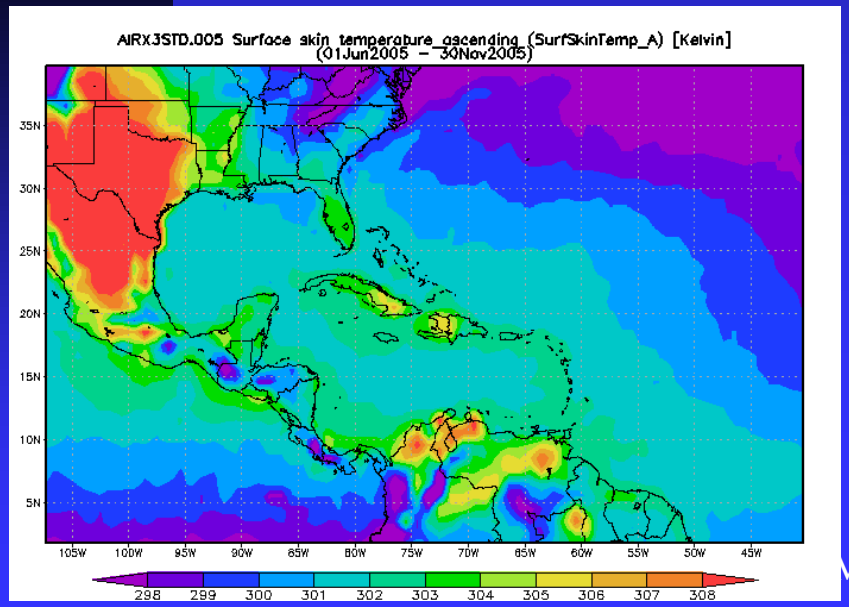
YOTC Examples: YOTC-GS L3

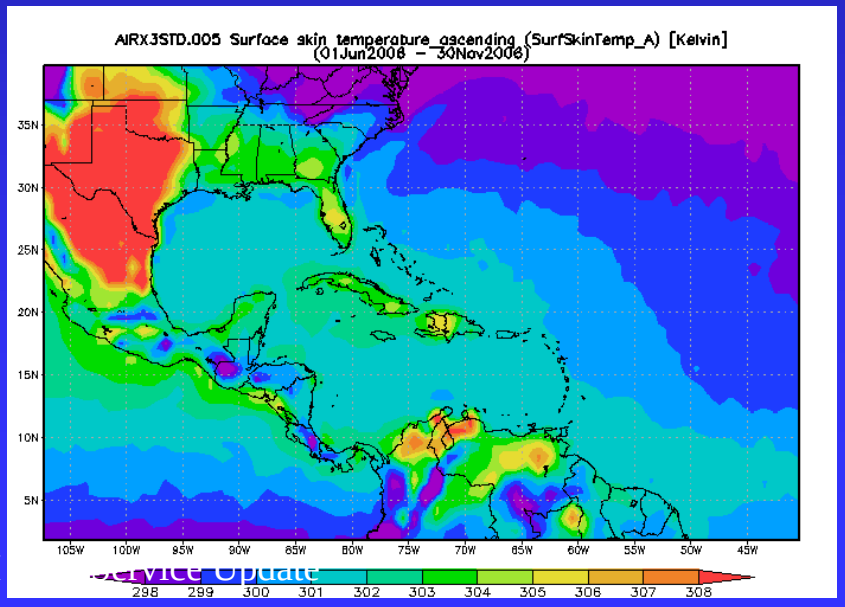


AIRS Skin Temperature

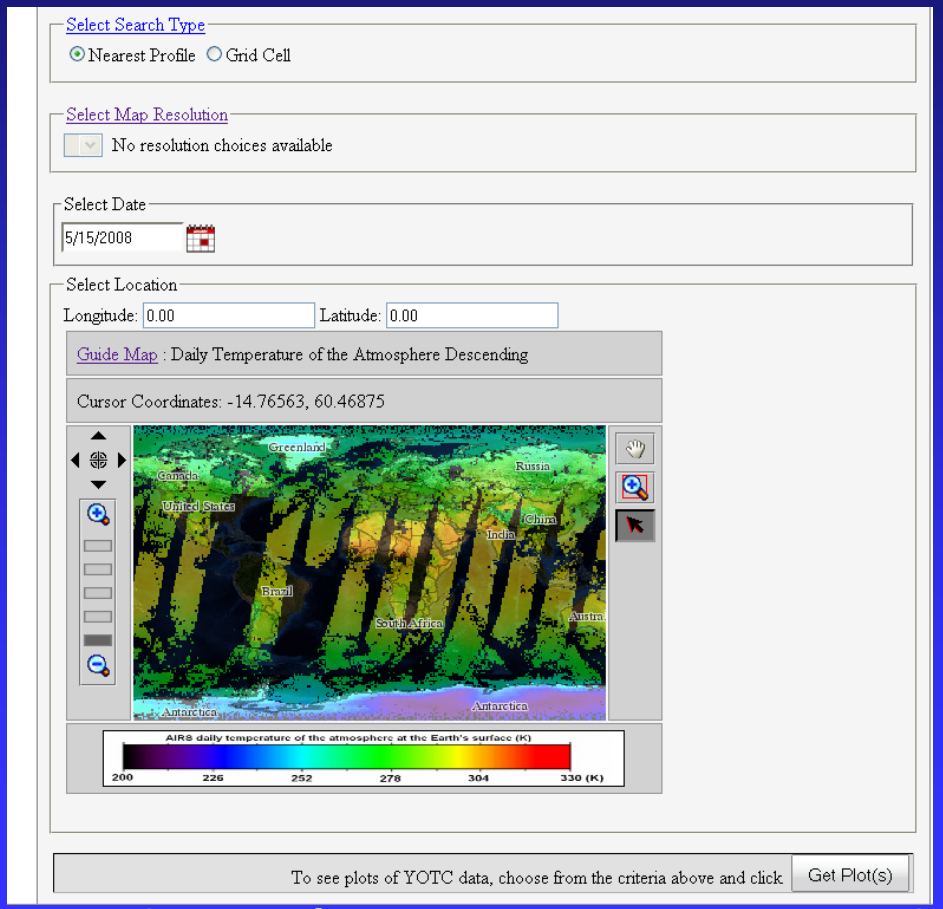




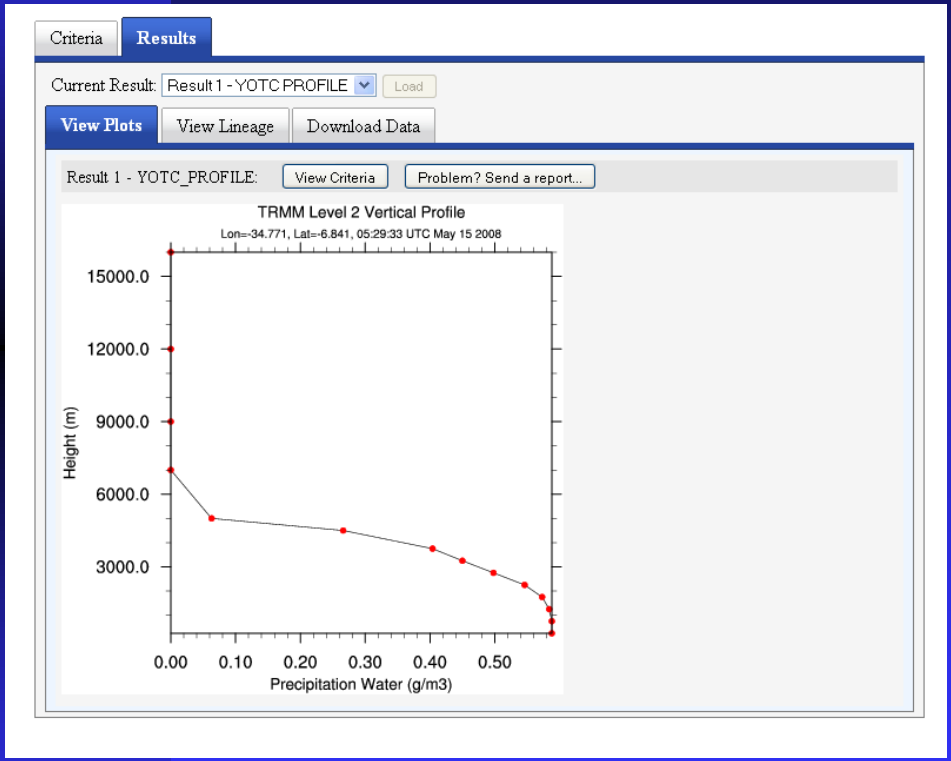


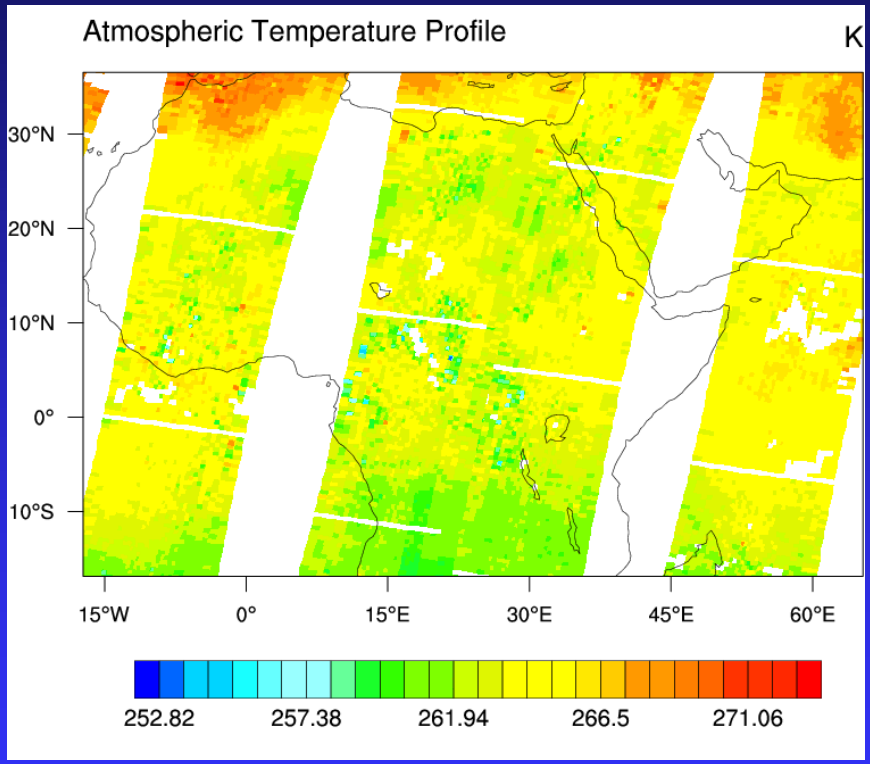


YOTC Examples: YOTC-GS L2

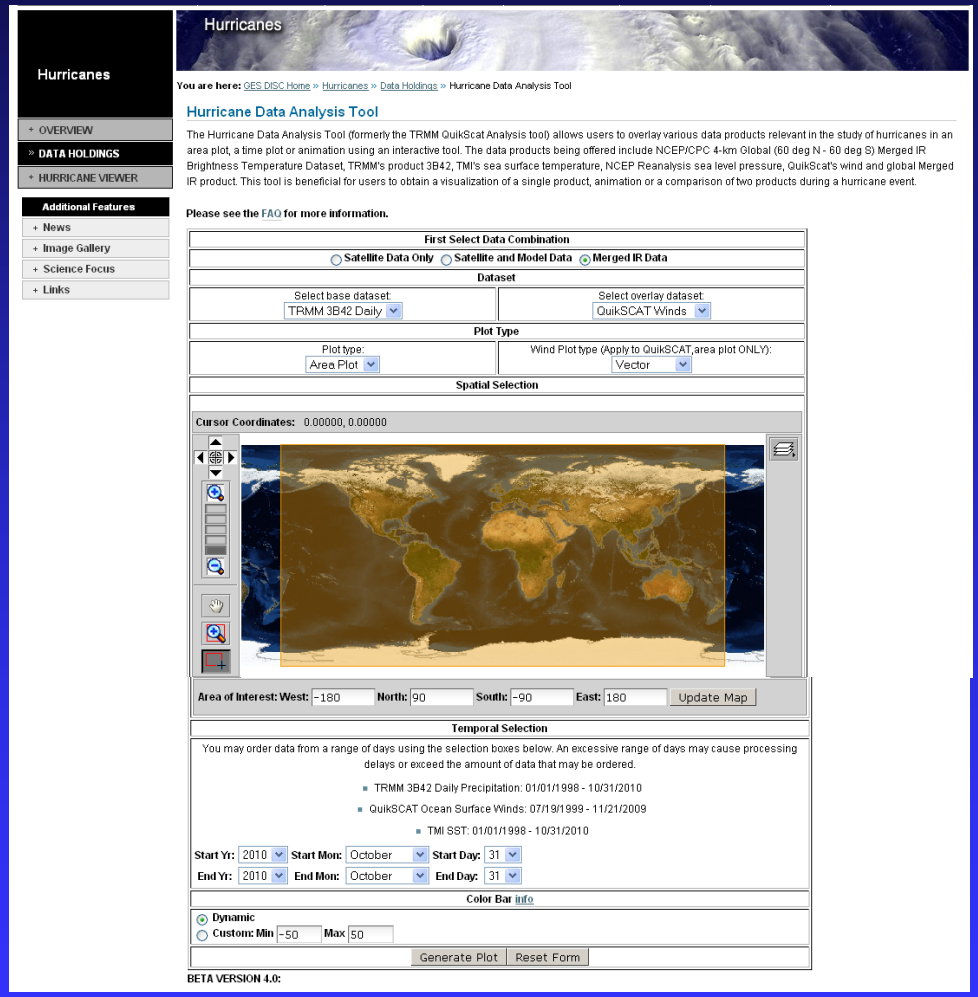


Sample plots:

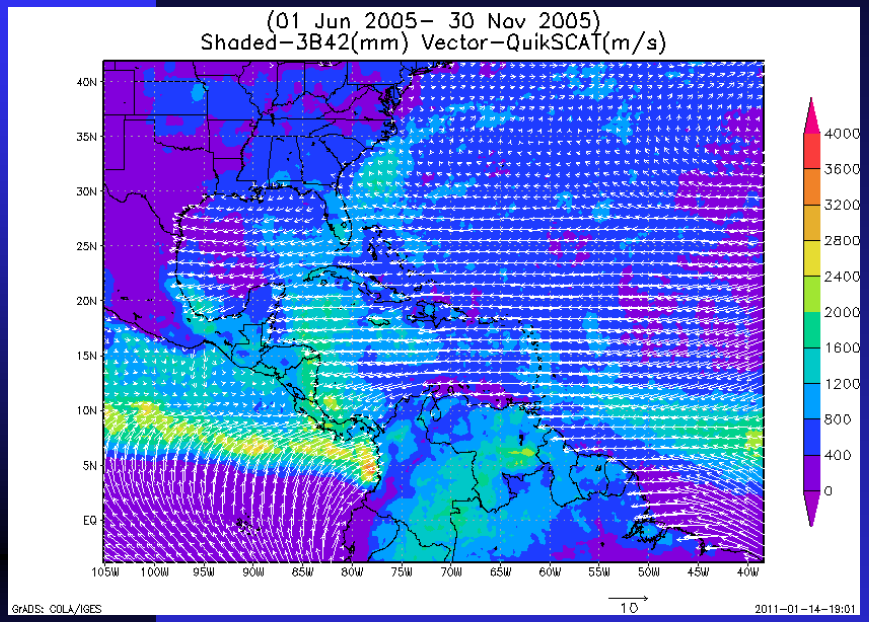


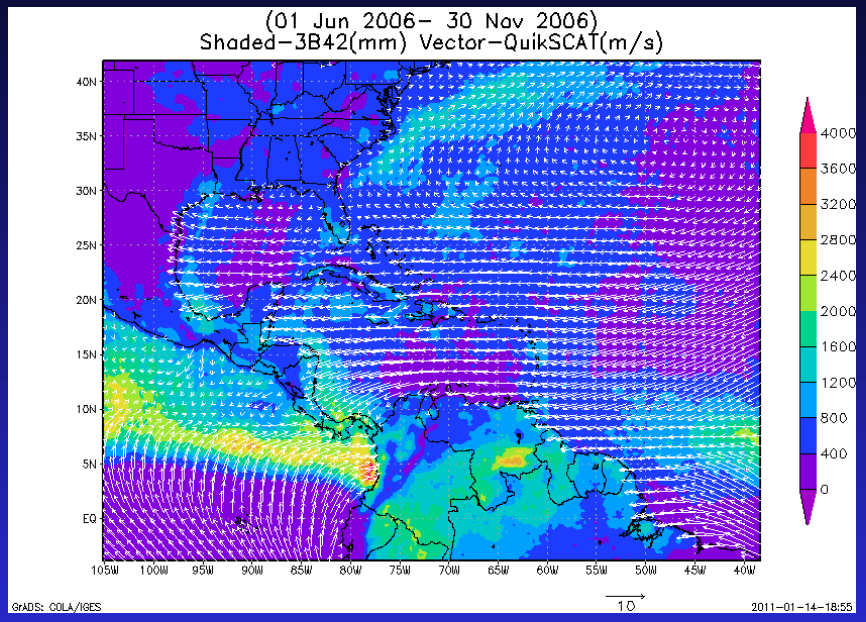


Hurricane Data Analysis Tool:



Samples:


(01 Jun 2005– 30 Nov 2005)
Shaded–3B42(mm) Vector–QuikSCAT(m/s)
40N
35N
30N
25N
20N
15N
10N
5N
EQ
105W 100W 95W 90W 85W 80W 75W 70W 65W 60W 55W 50W 45W 40W
4000
3600
3200
2800
2400
2000
1600
1200
800
400
0
10
GrADS: COLA/IGES
2011–01–14–19:01


(01 Jun 2006– 30 Nov 2006)
Shaded–3B42(mm) Vector–QuikSCAT(m/s)
40N
35N
30N
25N
20N
15N
10N
5N
EQ
105W 100W 95W 90W 85W 80W 75W 70W 65W 60W 55W 50W 45W 40W
4000
3600
3200
2800
2400
2000
1600
1200
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400
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10
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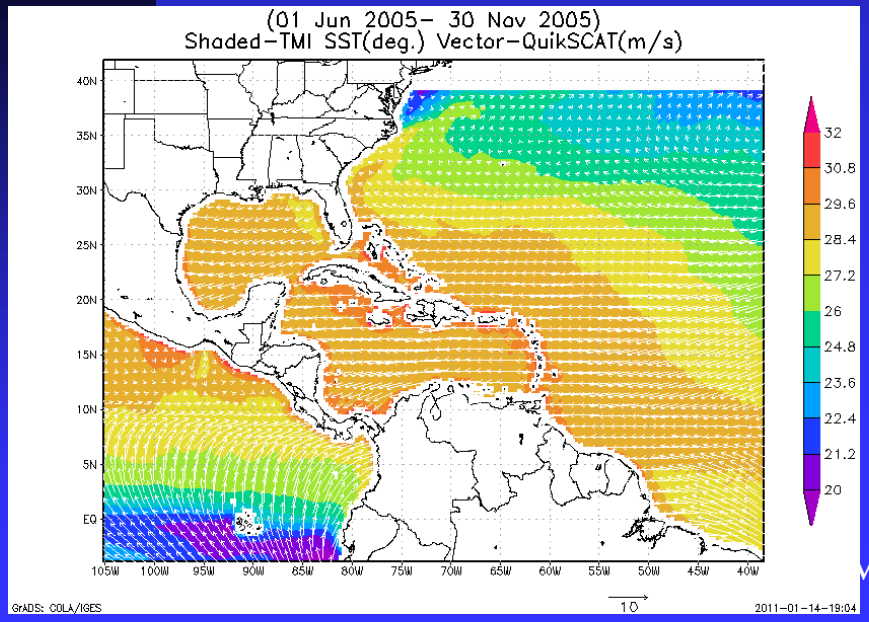
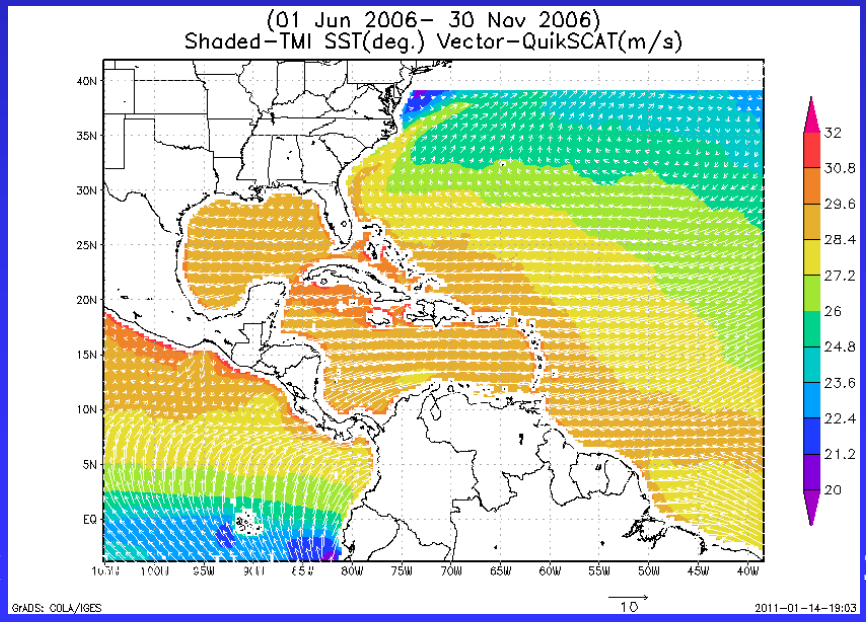
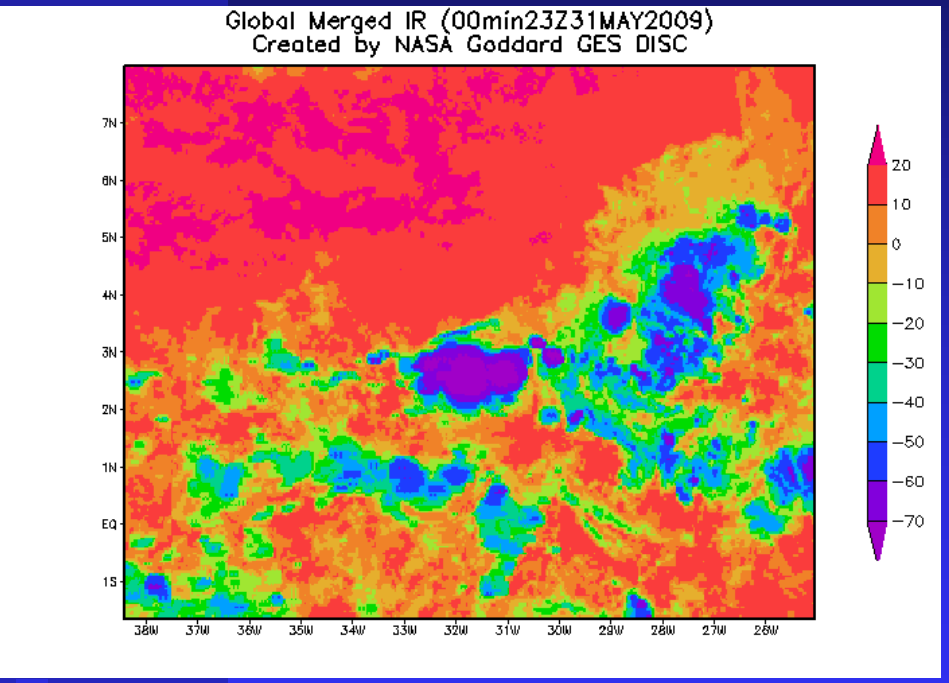
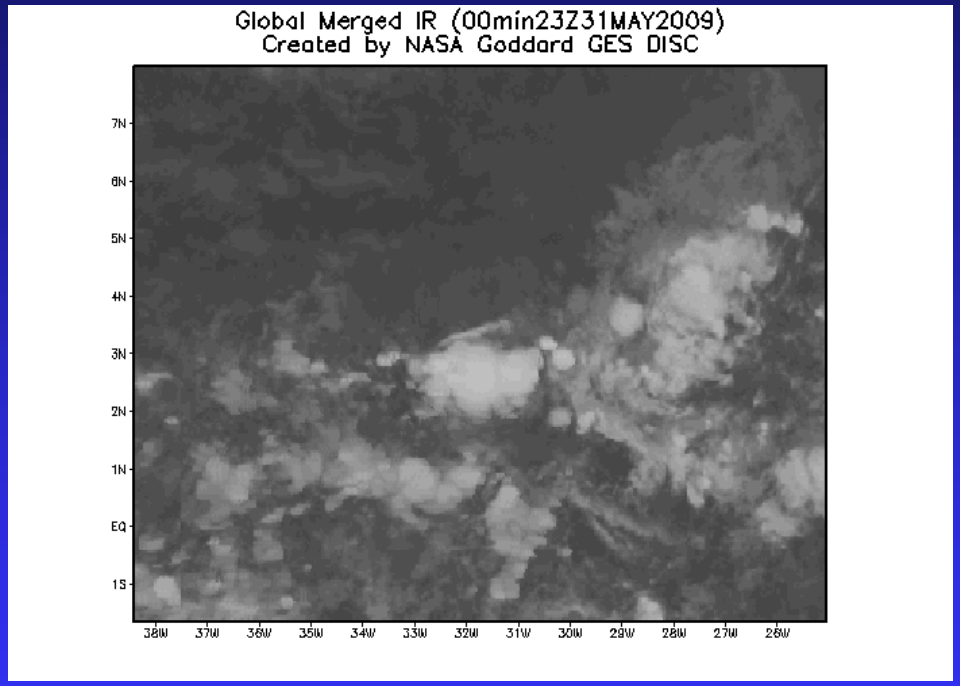
2011–01–14–18:55


(01 Jun 2005– 30 Nov 2005)
Shaded–TMI SST(deg.) Vector–QuikSCAT(m/s)
40N
35N
30N
25N
20N
15N
10N
5N
EQ
105W 100W 95W 90W 85W 80W 75W 70W 65W 60W 55W 50W 45W 40W
32
30.8
29.6
28.4
27.2
26
24.8
23.6
22.4
21.2
20
10
GrADS: COLA/IGES
2011–01–14–19:04

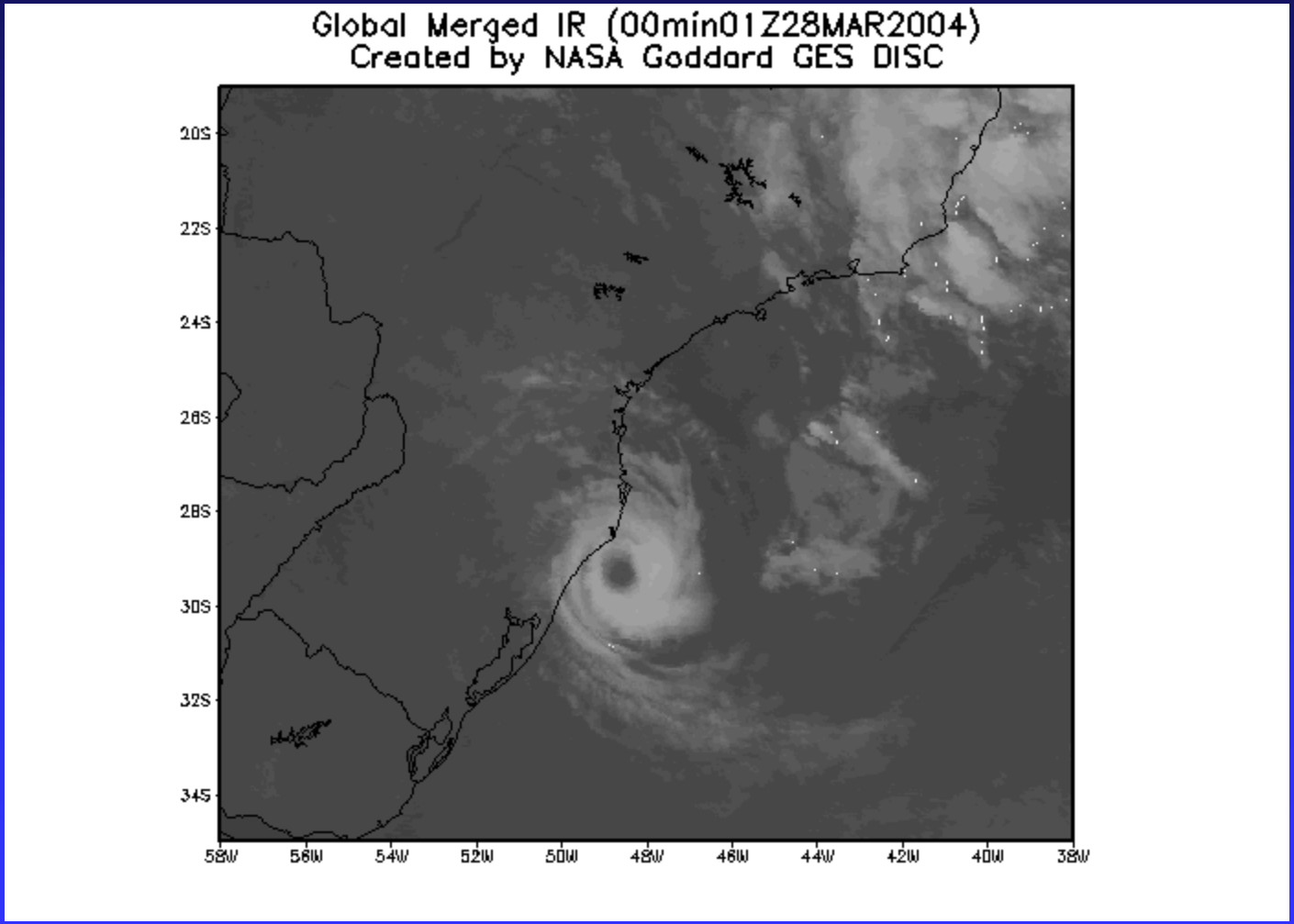

(01 Jun 2006– 30 Nov 2006)
Shaded–TMI SST(deg.) Vector–QuikSCAT(m/s)
40N
35N
30N
25N
20N
15N
10N
5N
EQ
105W 100W 95W 90W 85W 80W 75W 70W 65W 60W 55W 50W 45W 40W
32
30.8
29.6
28.4
27.2
26
24.8
23.6
22.4
21.2
20
10
GrADS: COLA/IGES
2011–01–14–19:03

AF Flight-447: Satellite Observation of Mesoscale Convective System Development on 1 June, 2009

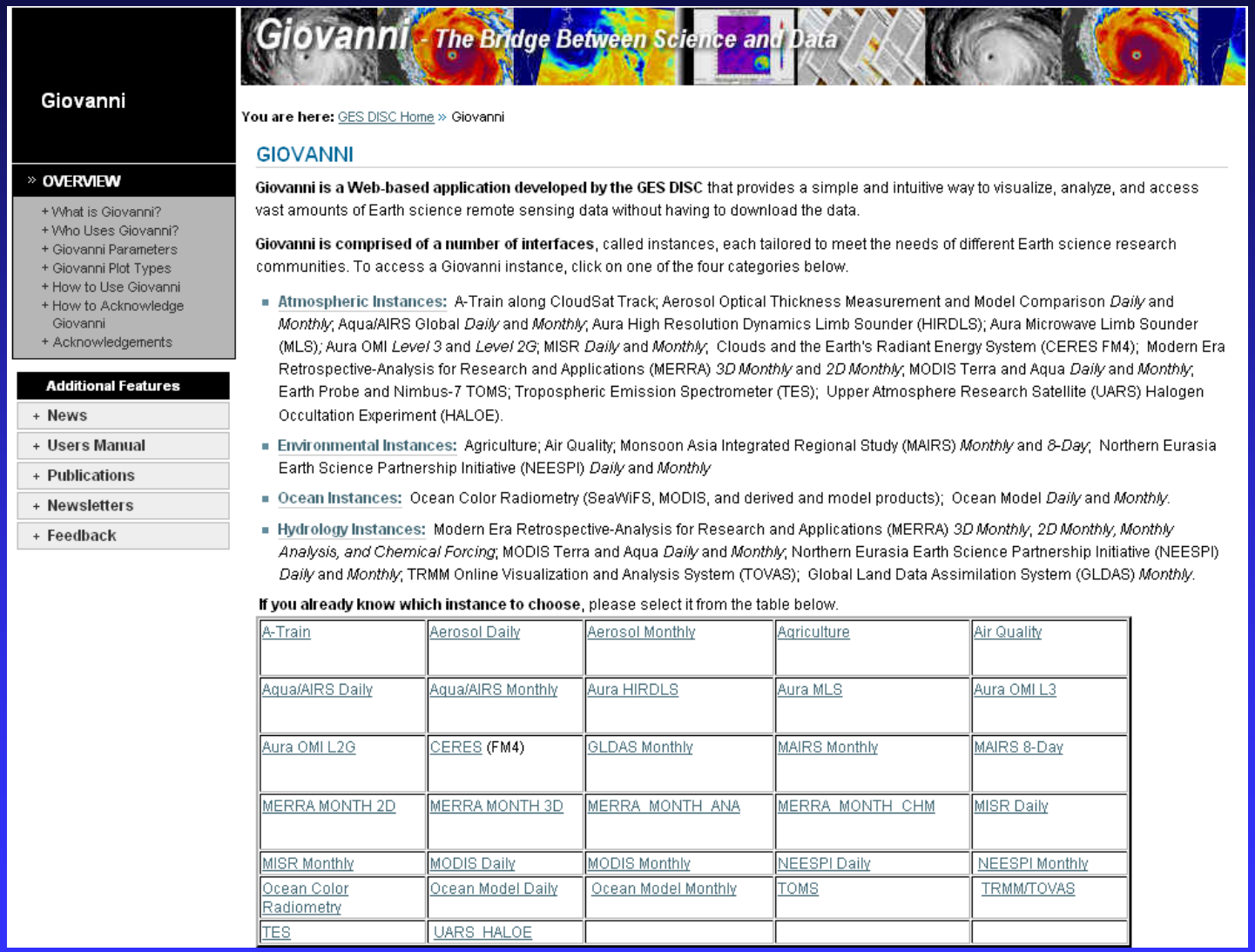




Examples: Category 2 cyclone Catarina – Landfall



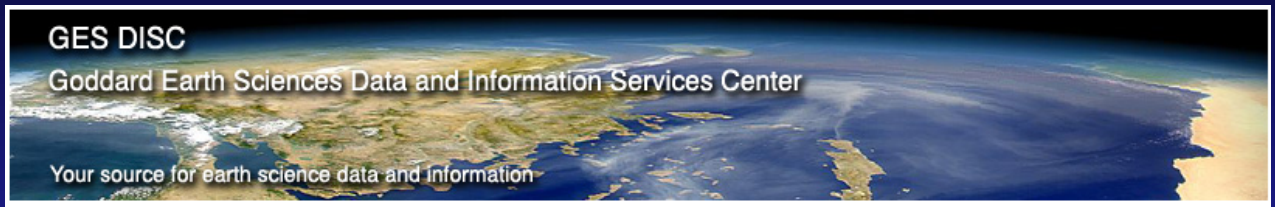
Giovanni (the GES-DISC (Goddard Earth Sciences Data and Information Services Center) Interactive Online Visualization ANd aNalysis Infrastructure:



Other services at GES DISC

- OPeNDAP
- WMS

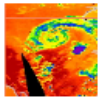
OPeNDAP



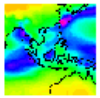
You are here: GES DISC Home » Services » Data via OPeNDAP

DATA AVAILABLE VIA OPENDAP (DODS)

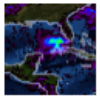
The Open Source Project for a Network Data Access Protocol (OPeNDAP) provides remote access to individual variables within datasets in a form usable by many tools, such as IDV, McIDAS-V, Panoply, Ferret and GrADS. Currently, the GES DISC offers the following datasets through OPeNDAP. *(N.B.: not all OPeNDAP datasets work in all tools.)*



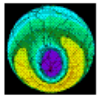
Atmospheric Infrared Sounder (AIRS) Moisture, Temperature, Cloud and Trace Gases
Visible, infrared and microwave sensors provide daily global temperature profiles with accuracy of 1 K per 1 km thick layer in the troposphere and moisture profiles with accuracy of 20% per 2 km thick layer in the lower troposphere (20-60% in the upper troposphere).Version 5also includes profiles ofCO and CH4 in addition to total column of ozone, CO and water vapor, cloud height and cloud fraction, and other atmospheric dynamic parameters



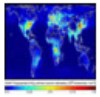
Microwave Sounding Unit (MSU) Deep Layer Temperatures and Ocean Precipitation Data
Deep layer temperatures and oceanic precipitation rates derived from 16 years of measurements taken by the Microwave Sounding Unit (MSU) flown aboard NOAA's Polar-Orbiting Operational Satellites (POES).



Tropical Rainfall Measuring Mission (TRMM) Gridded Rainfall Data
TRMM is dedicated to measuring tropical and subtropical rainfall through microwave and visible infrared sensors, and includes the first space borne rain radar. The TRMM orbit is circular, non-sun-synchronous, at an altitude of 350 km and an inclination of 35 degrees to the Equator, providing extensive coverage in the tropics.



Total Ozone Mapping Spectrometer (TOMS) Daily Global Gridded Data
Since 1978 TOMS has been flown on number of spacecrafts for monitoring global and regional trends in total ozone. It has providedlong-term (over 25 yrs) continuous record of total ozone. TOMS also provided measurements of atmospheric aerosols, volcanic SO2, ultraviolet irradiance, erythemal UV exposure, and effective surface reflectivity.



Ozone Mapping Instrument (OMI) Daily Global Gridded Data
OMI is a Dutch instrument flown (July 2004) on the EOS-Aura spacecraft (equator around 1:30 P.M. in ascending mode) to continue the monitoring of global and regional ozone. OMI also provides five major atmospheric pollutants: Tropospheric Ozone, Nitrogen Dioxide, Sulfur Dioxide, Aerosols, Formaldehyde in addition to BrO, Erythemal surface UV-radiation and Clouds.

WMS

tics
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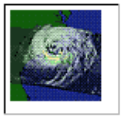
DATA AVAILABLE VIA OGC WEB MAP SERVICE

The Open Geospatial Consortium (OGC) Web Map Service (WMS) is an interface that allows the use of data and enables clients to build customized maps with data coming from a different network.

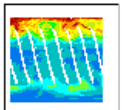
The GES DISC provides the following data through the WMS interface:

Atmospheric Infrared Sounder (AIRS) Near-Real-Time
BT_diff_SO2 (an indicator of volcanic SO2), RGB, and CO images are available for the near-real-time AIRS Calibrated Radiance data. WMS GetCapabilities...

Atmospheric Infrared Sounder (AIRS) Data Products
Visible, infrared and microwave sensors provide daily global atmospheric temperature moisture and trace gases throughout the atmosphere. AIRS WMS layers include surface temperature, total column ozone, CO and water vapor, cloud fraction, and other atmospheric dynamic parameters. WMS GetCapabilities...



Tropical Rainfall Measurement Mission (TRMM) Gridded Rainfall Data
The TRMM is the first mission dedicated to measuring tropical and subtropical rainfall through microwave and visible infrared sensors, and includes the first spaceborne rain radar. WMS GetCapabilities...



Ozone Monitoring Instrument (OMI) Data Products
The OMI employs hyperspectral imaging to observe solar backscatter radiation in the visible and ultraviolet. OMI WMS layers include total ozone and other atmospheric parameters related to ozone chemistry and climate. WMS GetCapabilities...

How does it work?

OGC WMS interacts with their clients via the HTTP protocol. In most cases, a WMS is a CGI program. The WMS specification defines a number of request types, and for each of request type it defines a set of query parameters and associated behaviors. Listed below are the requests available from the WMS:

Future plans:

- TRMM Version 7 (data, TOVAS, documentation update, etc.)
- Add TRMM Composite Climatology (1998-2009) to TOVAS
- GPM (to be launched on July 21, 2013)

URLs:

- TOVAS: http://disc2.nascom.nasa.gov/Giovanni/tovas/
- HDAT: http://disc.sci.gsfc.nasa.gov/HDAT
- YOTC: http://disc.sci.gsfc.nasa.gov/YOTC
- Mirador: http://mirador.gsfc.nasa.gov/
- Giovanni: http://disc.sci.gsfc.nasa.gov/giovanni
- OPeNDAP, WMS: http://disc.sci.gsfc.nasa.gov/services
- GES DISC: http://disc.sci.gsfc.nasa.gov/

Contact: Zhong.Liu@nasa.gov